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The Dream of Scientific Management on Railroads*

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It is impossible to discuss the status and prospects of scientific management on railroads without a short survey of antecedents and environment. And to begin with, it may fairly be said that perhaps the most important problem with which American public opinion has to deal at the present day is contained in the simple question, what is a railroad? Who built them, who owns them, who manages them, and above all, who is to build, own, and manage them in the future?

But hidden away in these railroad problems there are national problems of still wider significance. As a matter of fact, the American railroad to-day is the principal arena in which the advocates of socialism, government ownership, the rights of the laboring man on the one hand, and of principles of individualism, of competitive methods, and of capitalism, on the other, are displaying their forces, experimenting with their doctrines, and in a general way battling for supremacy. In this way, with constantly increasing emphasis, the railroad is becoming the testing-ground of the civilization of the future. Surrounded with issues of world-wide importance and made the butt of every variety of social, industrial and political reform and of every mood and whim of the reformers, as it seems to me, railroad administration in America now has its back to the wall and has entered the most acute and significant stage in its history.

The American railroad to-day may be looked upon as the National Sphinx. It has a question of vital importance to put to the whole people. With a significance that is unmistakable, it propounds to the nation the riddle of social and industrial

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progress. Private or public ownership, which? That is to say, private or public ownership and direction of brains, of industrial standards, of business ideals, of individual character? On the one hand well regulated social, industrial, and political freedom, on the other social, industrial, and political bondage.

The situation itself on the railroads, where the problem of efficiency, for example, is now being thought out and fought out in all its variations, is very instructive. It abounds with concrete illustrations. For example, do you wish to experiment with an invention of any kind? Try it on the railroad. Would you like to test any social or industrial reform movement? Try it on the railroad. Would you like to know anything about efficiency results relating to the "bonus" and "piece" systems? Give them a trial on the railroads. Would you like to know the meaning in America of private rights and public utilities? Apply and stretch the ideas to the breaking point and then study the problems exhaustively on the railroads, and at their expense. Do you wish to know to what extent labor should be permitted to dominate capital and to establish its own standards of wages, conditions and efficiency? Just stand on one side and watch the game. It seems to be all the same to the spectators. Let the contestants fight these problems out to the end on the railroad. The railroad exchequer, the managing department, and the public safety are at stake. But never mind, the backing of a few votes is sufficient to dump anything on to the railroads for experimental purposes.

Just how some politicians go to work in such cases would be rather amusing if the methods adopted were not so disreputable. I have in mind a legislative session in Texas some three or four years ago, when the railroads were quietly informed by the politicians that their constituents would require them to show results in the form of anti-railroad legislation. That was all there was to it. What followed was simply a surgical operation performed on the railroad, with the politician as the "Sawbones." No specific shortcomings on the part of the railroad were even hinted at. On the part of public opinion it was simply an appetite; on the part of the politician it was simply a job.

So under the influence of the usual political anæsthetic, it was suggested and arranged that this inevitable anti-railroad legis-

lation should take the form either of further restraints upon operation, of new forms of taxation, or of enlarged powers to the Railroad Commission. Applied to the railroads this is the form and method of the commonplace political hold-up. It is one form of state regulation.

However, it seemed to the railroad people in this case that additional restraints upon their operations could hardly make them much worse off than they already were, and so the legislature passed a fine batch of laws requiring them to stop trains at designated stations, laws specifying the candle power of electric headlights, and laws requiring them to erect sheds over car repairers, and so forth. In view of the fact that thousands of farmers in the State of Texas work out of doors every day in the year, this proposition to put roofs over the heads of car repairers was particularly amusing.

Now continuing our survey of conditions and environment, certainly one of the most astonishing features of modern civilization is the influence, both for good and evil, of the ordinary axiom, which under our present strenuous conditions is permitted only too often to degenerate into a mere catch-phrase. An axiom, of course, is a self-evident truth which is taken for granted as the basis of reasoning. Nowadays as soon as one of these high-sounding catch-phrases has succeeded in arresting attention and establishing itself in popular favor, it at once proceeds to dominate the situation. In social and industrial matters nowadays, nearly all problems are submitted to the test of these popular catch-phrases. If the progress in connection with the problems is in line with and recognizes the truth of the catch-phrase, the situation is supposed to be sound, otherwise it is open to the gravest suspicion, and as a rule is pounced upon by public opinion and chased off the field.

Now in the building and administration of American railroads there are a number of these catch-phrases which now seem to dominate the situation and influence the railroad business and policy from one end to the other. These popular catch-phrases are, among others, " Equality of opportunity," " Special privilege," " A public utility," and last, but not least, " Scientific management."

Ex-President Roosevelt, in a series of editorials on the general subject of " Nationalism and Progress," in *The Outlook,*

has placed himself on record as an exponent of this catch-phrase hobby-horse which he, and others, are now riding to death. He and his followers seem to look upon these axioms, not as propositions which must be sanely and cautiously dealt with, but as concrete and practical facts, to their interpretation of which all minds and all efforts must be directed.

Now of all the propositions that for a long time have been brought to the attention of the public, these problems of securing economy and efficiency in railroad work by the application of scientific methods, are the ones that should be most thoroughly and cautiously dealt with. Over and over again we have been informed by Mr. Emerson and others that scientific management can be applied to railroad operation and maintenance with absolute certainty as to results. In backing this up the Efficiency Engineer points to his tables, to his statistics, and to financial and other results, and then says in very plain English to the manager —" Here you are! This is the thing itself. We present you with ideas, with plans, with demonstrations, with results financial and otherwise, in concrete and unmistakable form. All you have to do now is to adopt our methods in order to reap all sorts of industrial, moral and financial harvests."

But as I look at it, the problem has not yet been settled either one way or another by any demonstration or experiment whatsoever of which we have any knowledge in the history of American railroads. It is true that in what is known as the Santa Fé case, we have an illustration in miniature of the possibilities that are locked up in scientific treatment of work on railroads, but nevertheless the whole business is still overshadowed by still greater human problems that are still awaiting adjustment. It is all very well to select your ground, expel your adversaries, remove your obstacles, install your plant, operate your systems, surround the whole with palisades and a guard, and then reckon your profits by the million. In spite of all this, however, the problem itself in all its wide human aspects in a democratic country is still with us.

However this may be, it certainly calls for something resembling audacity to line up against the world of logic, of science, and of legal acumen which is arrayed on the affirmative side in this discussion of scientific management. So far as I can make out, the movement to promote and secure efficiency in railroad

work has received the approval of every arm of what may be called social and scientific service. The newspapers and magazines have explained and simplified the matter for the benefit of millions of readers. The facts and the figures in the case have been verified a thousand times, the enterprise itself has been surrounded with a halo of popular and academic approval, and the ship of Scientific Management has been launched under the most auspicious circumstances.

But after a theory has been advanced and carefully tested, the mind naturally reverts to ways and means. And in regard to these ways and means I intend to confine myself exclusively to the railroads. The topic is big enough and the field is wide enough. But lest the latter part of my commonwealth may seem at times to forget its beginning, I wish to start with the statement that generally speaking, while I believe in scientific management, applied to every sphere of human activity, as a practical asset in railroad betterment work at the present day, I look upon it all, to a great extent, as a dream.

For the situation on the railroads to-day is most peculiar. As I look at it, it is a strong masterful situation, a climbing, struggling, hopeful situation teeming with human problems of tremendous importance, which are being worked out in a surprising way by certain forces that have never had the handling of affairs before in the world's history.

Now, connected with betterment work of every description in a democratic country, there are always certain drawbacks and issues relating to the wishes and conduct of individuals and workers that wait for consideration and solution at every stage of the game. In this way, and very naturally, the problems relating to scientific management on railroads call for a careful scrutiny of the conditions and the men to which our scientific principles are to be applied.

As a matter of fact, then, on the railroads to-day, the principal factor with which the Scientific engineer has to deal is the employee. It is becoming more and more apparent to those who are carefully watching the trend of affairs in the railroad world that the responsibility for peaceful or violent readjustment of railway conditions in the future will, and must rest with these wage earners. As a thoughtful writer in a recent issue of the *Railway Age Gazette* has stated the case:

"The wage question and its collateral problems stand out by themselves. Nor is that question a simple one expressed in the mere sum total of the millions of dollars that show the wage increases. It is complicated by the continued and increasing assertiveness of labor; by its successful demand for shorter hours and more limited runs; and its resistance to piece work and its diminished efficiency due to that and other causes, with reliance on the union replacing loyalty to the corporation and responsibility to the operating manager. Not the least suggestive of the comments of some of the leading railway heads on the recent rate decisions has been their opinion that, had higher rates been granted, organized labor would ere long have tried to absorb them."

Whether we agree with this summing up of the situation or not, the fact remains that this is actually the human material and the industrial prospect with which the modern railroad manager has to deal. And as far as I can make out, these employees do not wish to have anything to do with scientific experiments in regard to their pay rolls and their conditions. This is actually the individual and collective decision of labor on the subject. The way the two forces, labor and management, line up on the matter is somewhat as follows: Scientific management says to the employee:

"Look here, I am running this business and I have worked out and drawn up a scientific schedule. I propose to standardize conditions, operations, and pay roll. By this method better work, better wages and, withal, a true economic system of operation can be assured all around. I would like to secure your coöperation in the matter. Your job is now going to pay a wage in a general way, according to the brains and energy you put into it."

On the other hand the employee retorts:

"To begin with," he says, "I am not so sure about your position. In fact, I come pretty near running a good share of this business myself. So I may as well tell you right off, that this job is going to pay me not exactly what I put into it, but just as much as by hook or by crook I can get out of it."

As a matter of fact, at the present day the legitimate manager and I are already doing the best we can in this matter. Of course it is easy enough for scientific people to suggest all sorts of

economies and improvements. But the labor interest is a tremendous force on the railroad nowadays, and at all costs we must get along harmoniously with the management. In butting in and forcing the situation, and in trying to hold the modern manager up to public censure on account of his unscientific methods in spots and places you are doing more harm than good. And by the way, what is the rest of the world doing all this time along the same lines? Have they, too, got the scientific bug in their bonnets? Not a bit of it. As a matter of fact, for a number of years past the railroad employee, whom you now propose to doctor in this way, has been systematically pillaged and abused by outside forces in no way connected with the railroads that have no desire to be scientifically treated themselves. I am not one of those who believe in unnecessary muckraking, or in the rattling of dead bones, but the employee must not be deprived of his illustration, especially when evils still exist perhaps in modified form. So addressing himself to public opinion he remarks, "What do you think of an award of nine thousand dollars awarded to the widow of a railroad man whittled down to three thousand before she even got a peck at it?" I suppose public opinion would be still more emphatically shocked if I were to insinuate that even in a single instance in the confusion of a railroad wreck an arm has been off instead of a finger on account of the extra remuneration attached to it. Is this scientific treatment?

But railroad labor is not satisfied with clothing its arguments in figurative language. The more he thinks it over and studies the problem of economy in railroad work, the less he cares for the overtures of the scientific engineer. Of course it is too bad, and science and efficiency are surprised, almost sorrowful, when, in spite of all its plans and promises, labor remarks as Hamlet did to Ophelia, "I love you not," and the response in both cases is, "I was the more deceived." Be this as it may, the employee on the railroad to-day has also a solid background of business advantage already secured which, in its present stage, the public may not exactly like, but nevertheless, the illustration I am about to give you will at least demonstrate the practical and financial reasons why the railroad man interposes objections to scientific treatment.

For instance, some time ago I myself was called upon to work

just one hour and a half before my regular time to appear on the job—I got an extra day's pay for this hour and a half. The schedule arranges this. Is there any likelihood that scientific management will treat me any better? Again, I have in mind a certain train crew that works in a locality where there is switching to be done all day long between widely separated side tracks and industrial plants. Two or three times a week on an average, this crew is called upon to drop its work and take a little trip a mile or two away from their regular stamping ground. When this happens they get an extra day's pay for the work, although it comes easily within the time of the stipulated day's work.

The railroad business is honeycombed with illustrations of this nature going to show that the railroad man's schedule has scientific management beaten out of sight—considered as a financial attraction to the railroad man. At the same time it must be remembered that there are features connected with the railroad man's handling of his own interests that are very unsatisfactory from the view point of the public.

For example, not so long ago in one of the large terminals a coach on a passenger train was derailed by reason of rough handling or miscalculation. It was perfectly possible for the engine that was attached to that train to replace the car on the iron, but the verdict of the employees concerned was that there were wider interests at stake, and that it was a job for the wrecking crew. This means a delay to the passengers of some forty minutes.

Now, regardless of our opinion in these matters this is actually the situation with which the legitimate manager on the railroads to-day is confronted when he attempts to adapt himself to scientific principles. Up to a certain point the efficiency program and the railroad man's schedule are somewhat similar in theory. The efficiency engineer says to the worker in so many words, " Each man shall be engaged at a definite and hourly rate, this rate being the current local rate for his trade or kind of work. This rate will be paid for every hour he works, irrespective of his efficiency. From this point onward, however, the plans are radically different.

But there is still more to be said on the subject. For this matter of scientific management in its application to railroad work divides itself, like many other problems, into principles and prac-

tice. So far as the theory of scientific management is concerned, the verdict of thoughtful people, taking a general view of the matter, is bound to be favorable. Now granting the correctness of our principles and the satisfactory results to be expected when our hands are free to apply our methods in our own way; there still remains the question of expediency. Absorbed in the working out of this philosophy and its scientific calculations, the efficiency engineer troubles himself but little with this matter of expediency. He takes it for granted that sooner or later expediency must bow to the demonstrated economy and efficiency. If he thinks this is the logic of the situation as it relates to us, he is very much mistaken. He fails to take into account either the opinions, the plans, or the strength of the railroad men as a body, or the position and functions of the railroad manager. Whether we enjoy the situation or not, as a matter of fact on the railroads to-day, for industrial, social and political reasons, the expediency difficulty in regard to the efficiency problem overshadows every other consideration. The efficiency doctor, however, does not propose to be checked with any such argument. As he looks at the matter he is either right or wrong. So he insists on butting into the railroad business, and shouting at the top of his voice that he would like to have this matter settled once for all on its merits, and in his favor, so that his principles and methods may be applied and extended into every branch of the railroad service!

In applying the "New Conception of Industrial Efficiency" to the railroads the Efficiency Engineer has an awful job on his hands. Strange as it may seem, his principal opponents are the railroad managers and the railroad men. The manager's position is easily understood. For the manager on the railroad is the Expediency Engineer. All problems and issues are in his pigeon holes. Of all things he, too, desires efficiency of service and so far as possible the application of scientific principles. But as a matter of fact his desires and opinions in this particular matter cut very little figure. Amidst all the babel of divers scientific propaganda and the no less insistent demands and threats of organized labor, he is called upon to hold the reins in the interests of the whole people. Out of a caldron of industrial and political interests and factions on the railroad he must pluck by hook or by crook, in some way, the flower of satisfactory service.

Just a word or two about the manager's side of the problem. In answering the call of the Efficiency Engineer to apply scientific methods to railroad work, the very first consideration in the mind of the manager is the employee. To tell the truth, the railroad man is a proposition the railroad manager cannot dodge. The position and prospects of the railroad men were voiced very distinctly at a mass meeting of employees held in Boston a few days ago. The remarks of one of the principal speakers were as follows:

"It is the combined labor of thousands and thousands of workers that makes it possible to run a railroad. We stand on the industrial battle field with nothing but our labor to sell, and we must have organization to say what pay we shall receive and what conditions we will work under."

"It is my contention," the speaker continued, "that we must reach the stage sometime when everyone employed on a railroad will belong to a union, and all the unions to one federation or brotherhood of railroad employees. When that day comes we will not need the injunction, nor fear it. We can sell out every man on the railroad unless our just demands are granted."

The would be scientific manager then is confronted with this state of affairs on the railroad to-day. It must be remembered that this position of labor is not only sound and logical from the *employee's point of view,* but public opinion, expressed in all sorts of ways, has actually coaxed and encouraged the evolution of the employee and the safeguarding of his interests along these lines. Public opinion is now called upon to consider and deal with the results of this evolution.

Practically speaking then, this survey refers to men in every department of railroad service; consequently the manager has to take the situation as he finds it and deal with it as best he can.

But now let us get still closer to our subject and see if we can discover what it is that the Efficiency Engineer or advocate is now offering to the railroad man in the interest of the payroll and the general well being of the worker.

Let us take a concrete illustration from one of Mr. Emerson's lectures—speaking on the topic of car repairs:

"At Cleburne, Texas," we are told, "prior to the introduction of efficiency principles as to separate operations, there were continually from six hundred to seven hundred freight cars on the repair tracks, with a force of over two hundred and sixty men,

and an average payroll of $11,750. Since the introduction of efficiency principles cars detained for repairs have averaged only two hundred per day, the force has been greatly decreased, and the payroll reduced to $10,300, although each individual worker earns much more, the 'bonus' plan having replaced 'piece' rates."

Now let us be fair to the railroad man in this matter. It would be very nice, of course, to have him blaze the way for other people in such matters; at the same time you have no business to be horrified if he hesitates. So taking car repairers as a unit and railroad men as a still larger unit, acting for the interests of labor as a whole, for men in the shops as well as men on the road, what are the attractive features in this illustration that can be depended upon to appeal to the sympathy and enlist the co-operation of these railroad workers?

Perhaps if we clothe the illustration in a different dress and remove the scene of action away from the railroad it will not be necessary to answer the question in detail, or to call your attention to the moral contained in it.

Supposing then, we say that in some large city, prior to the introduction of scientific methods as to separate operations, there were continually from six hundred to seven hundred law cases of various kinds in various law offices and in court pigeon holes, with a force of two hundred and sixty lawyers to take care of them, and an average monthly payroll of $11,750.

Since the introduction of scientific and efficiency principles in such matters however, the cases retained for adjustment have averaged only two hundred a day, the force of lawyers has been greatly decreased, and the payroll has been reduced to $10,300, although each individual lawyer earns very much more since the scientific plan supplanted the "scrambling method."

I respectfully submit this plan No. 2, for saving another million dollars a day, and unless I am very much mistaken the railroad employee is perfectly justified in stating his objection to certain propositions of scientific management in this form and in this kind of language. Like the rest of the world at the present day, he can stand scientific treatment in small doses, but when it comes to the other fellow doing all the planning and all the figuring, the railroad man rises to remark that he too has plans, specifications and ideas which he begs to submit to the attention of the public.

It is unnecessary to multiply illustrations showing the all-around benefits to be derived from the application of scientific principles to railroad work. Only give the Efficiency Engineer and the Scientific Manager half a chance and they will simply overwhelm you with facts and figures, the truth and practical utility of which no man in his senses will attempt to gainsay. But unfortunately for the application of scientific principles to railroad work, the problem at the present day, as I think I have demonstrated, is surrounded by an industrial situation to which, as I look at it, all other issues are just now subordinate. In other words, the real problem for the manager to-day is not how to run his business upon the most economical and scientific principles, but actually and practically how to run it at all.

It is true the manager is now receiving a good deal of outside assistance; that is to say, he is being regulated. Half of this regulation, however, is in the nature of direct interference. But while the manager is being regulated, every other force with which he has anything to do has a free hand. It is true some people have an idea that the government can regulate the other side of the problem, collective labor, in the same way that the manager and capital can be regulated. A greater delusion never existed. As a matter of fact, the unwritten laws and influences of organized labor are not subject to legislation of any kind. The levelling process in modern industry, the blocking of individual initiative and the elimination of personal responsibility are beyond the reach of human laws.

Yet what becomes of scientific management and industrial efficiency when these ideas and tendencies have full swing? Let us take a concrete illustration. A few years ago the pay in the signal tower where the writer works, was $13 a week; to-day it is within a few cents of $19. In those days we used to have duties of a varied character outside and inside to attend to; to-day we confine ourselves to the trains and the manipulation of the interlocking machine. We used to work twelve hours a day; now we work eight. Our schedule, which represents the efforts of our union, is to be credited with this satisfactory result. The work in the tower is divided into three shifts, morning, afternoon and night. Formerly these shifts carried different rates of pay, according to the work and responsibility. Scientific treatment of this kind has now been banished. All the men in this

tower are paid alike, regardless of their experience or duties, and we now have a clause in our schedule which calls upon the day man, after thirty years' service, in this instance, to take his turn with the others working nights. In this way all distinction between men, experience, efficiency, conditions and the public interests connected with them have been obliterated.

If the advocates of scientific management and industrial efficiency want something to do, let them tackle the problem right down here at the root.

Every railroad in the country is honeycombed with illustrations of the impediments that are thrown in the way, not merely of scientific management but of any management at all by the schedule and the government regulator. Take the regulations in regard to the hours of labor—time was when if I wanted to get off duty for some urgent personal reason I could, with the permission of the superintendent, call upon one of the other men to help me out. For twenty-five years I watched this method of handling the men in a human and scientific manner and never knew it to be abused. The management looked upon us as men; government regulation at times treats us as things. To-day if you want to change shifts with another man, in order to go to a funeral, you will be referred to the Interstate Commerce Commission; no man can exceed his time limit of nine hours except in cases of emergency, and according to the accepted ruling in such matters you cannot plead emergency for anything that you can foresee. When a man is dead you can easily foresee the funeral. Therefore, the only funeral a towerman can go to is his own. Of course if there happens to be a spare man handy you can get away by losing a day's pay, but what becomes of scientific management and economy in such cases, from the employee's point of view?

The fact of the matter is, the manager is being elbowed out of his job, and as his power and sphere of influence decreases the louder becomes the demand of public opinion that he should exercise his scientific ingenuity.

Personally I am in sympathy with the movement for the application of scientific principles in railroad work when it is not permitted to blind us to the industrial situation with which it is now surrounded. I cannot help being profoundly impressed with the methods and the results to which our attention has been

called on the Santa Fé Railroad and elsewhere. But the palisades and the barbed wire are still there. At the present day scientific treatment is working and is successful in spots. It probably cost the Santa Fé Railroad $5,000,000 to install and maintain the open shop in one small section. If past and coming events cast their shadows before any radical extension of scientific management along these lines in railroad life by outside regulation interference or influence will lead to trouble.

The alternative was presented to us the other day with unmistakable significance by Judge Knapp, then chairman of the Interstate Commerce Commission, speaking to the men who sell supplies and equipment to the railroads at a meeting held in New York, described the situation as follows:

> "You know better than I can tell you, that if Government regulation is voted a failure, behind that will stand Government ownership with all its attendant revolution in our social life, its social dangers and its deeper peril for Republican institutions."

Added to this comes the public statement of the president of one of the largest railroad systems, that we are much nearer Government ownership of railroads in this country than railroad men care to admit.

For my part I cannot look at the problem as a whole in that light. To tell the truth I have unlimited faith in the men and in the management on our railroads to-day. If public opinion does not insist upon regulating the whole business into a sort of industrial monstrosity there is going to be a whole lot of "come back" to this business. There are now signs that railroad men all over the country are growing more tolerant, reasonable and individualistic in their treatment of questions that concern the public as well as themselves. They have been building up a system from which they can now operate and legislate for themselves in safety. From the standpoint of the individual worker this makes possible introspection, followed by a wider recognition of duties and responsibilities. In a democratic country the strength and growing intelligence of labor contain perhaps its greatest promise. From the moment when people can afford to be just and tolerant all manner of righteous individualisms begin to assert themselves and spread outwards.

Along these lines I think—I hope—the American railroad man

with his education, his training, and his splendid opportunity is destined before long to lead the way into a new and better era of industrial relations. The railroad man is not to be judged or condemned for his present attitude. He has arrived at a certain stage in his progress upwards, and he insists upon fortifying his advance at every step. If public opinion is wise, it will leave this "New Conception of Industrial Efficiency" on railroads, which is at present in the dream stage of its evolution, to be worked out and worried out in a sane and safe way by organized labor and organized management. With both sides in the problem continually widening their horizon and enlarging their views of social justice and industrial efficiency, the outlook for the future is by no means discouraging. At the present day the employee on the railroad may be mistaken in his attitude towards industrial efficiency, but he is just beginning to find himself at heart, and at bottom he is resourceful, responsive, well disposed and public spirited.

As for the manager, the prospect with the assistance of a wiser and more charitable exercise of public opinion is still brighter. The public should get acquainted with these managers, their names, their ideas and their work will stand sifting. It takes nothing from the merits of the situation that pressure of various kinds, with the social conscience behind it, is in the main responsible for the new school of railroad men who are now in the field. The important questions for the public are, who are these men and what are they doing? Let us not be afraid of the facts and of the personalities connected with them.

On the Southern Pacific there is Mr. Kruttschnitt, on the Frisco Lines we have Mr. Yoakum, on the New York Central we have Mr. Brown, on the Wabash there is Mr. Delano, on the Baltimore & Ohio there is Mr. Willard, the New Haven System has Mr. Byrnes, the Chicago and Northwestern has Mr. Gardner, on the Rock Island there is Mr. Mudge, on the Santa Fé there are three or four particularly strong men, and finally the Pennsylvania managers are practically all men of the same progressive and sterling character. There are many others. We on the railroad, at any rate, know these men and understand the campaign in which they are engaged for the brightening and bettering of the railroad business.

But the educational effect of enterprise and public spirit con-

nected with railroad management has been, up to the present, practically wasted. These wonderful moving pictures of railroad life and progress have not been allowed to speak for themselves, and their interpreters have been neither very friendly nor very wise. Public opinion has acquired exaggerated and distorted ideas of railroad management. To an unnecessary degree it has confounded the functions of the operating department with financial manœuvers on Wall Street. It has been treating superintendents and operating managers who have actually to live with the public and attend to their interests, with pills intended for people who, rightly or wrongly, have in the past been looked upon as political and financial jugglers.

Finally, the danger ahead of us just at present is that this "New Conception of Industrial Efficiency" will probably be used to force the hand of the manager and thus become a great industrial issue ahead of its time.

The Fundamental Truth of Scientific Management*

By Harrington Emerson

Some truths are so obvious that we cannot see them. As to any accepted belief it is a remarkably good plan to assume that the opposite is correct, and we are very likely to stumble on some fundamental but overlooked truth. Beginners on bicycles make the mistake of supposing that the wheel is to be balanced by turning the handle bars, which they proceed to grip in a desperate fashion, hoping through the movement of the front wheel to balance the body. A rolled hoop will balance itself; so will a free bicycle wheel, and the adept knows that the body sways the wheel, not the wheel the body. Down to the time of Copernicus the world accepted the belief that the earth was the center of the universe, and that moon, sun, and all the stars whirled daily around it. Chanticler, who believed that his crowing made the sun rise, was not more foolish.

One of Poe's celebrated tales is entitled "The Purloined Letter," a letter stolen and hidden so that the most careful search could not find it, although it was in plain sight all the time. For centuries mankind persisted in believing that the world was flat. Our eyes told us that the sun and moon were at least circular. Any child with a cherry could demonstrate that the phases of the moon proved it to be spherical. The disappearance of the hulls of vessels below the horizon proved the curvature of the earth. The limited expanse of the sea seen from a mountain top proved the curvature as did also the curved shadow of the earth on the moon or in an eclipse. Yet humanity persisted in thinking the world flat.

There are other truths just as plain, just as obvious, in the economic realm—and just as much overlooked as the roundness of our world. It is a fundamental truth that progress of any kind, as well as deterioration, is made along lines of lessening resistance. As a river flows from the mountain slope to the sea it takes the course of least resistance, it changes from a turbulent, shallow, foaming stream to a placid, wide, deep, tidal river. This is physical geography. The whole history of evolution

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shows that however difficult the first step, more is accomplished with less work, with less effort, in the subsequent steps.

It is on this truth that scientific management rests. Some of my friends, the labor leaders, have come before the public with two ultimata. The managing class shall not manage, and the workers shall not work. This position of theirs rests on four fallacies.

The first is that a partisan has the right not only to plead but also to decide a cause, that Mr. John Mitchell, Mr. Stone, Mr. Gompers, Mr. Morrisey, have not only the right to set forth the claims of labor, but also to define its rights. No pleader, no interested party, whether manager or worker, can fairly and unbiased decide what is right and fair and true. The second fallacy is that the laws of evolution can be stayed, laws that began before humanity was, that will continue to operate after humanity is no more. In the great movement of adjustment of the workers to the world's work, the three classes, workers, managers, and capitalists have again and again butted their heads against stone walls simply because they did not know what they were about. The third fallacy is that more result necessarily means more work, that the economies proposed by great efficiency, by more common sense, are only attained by adding to the burden of the worker. The fourth fallacy is that increased efficiency will throw men out of employment.

It is not only workers who disregard fundamental laws. Managers have sinned more in this direction than workers, and they are more responsible. Labor is to-day about sixty per cent efficient, but capital is only thirty per cent efficiency, and workers have a right to demand that economies in the use of capital shall be realized, that capitalistic waste shall be eliminated at least with the same zeal that labor wastes are attacked. The manager who eliminated his three capital wastes, who eliminated the other four wastes, would be so strong that he need fear no combination of workers. He would have done for them most of the things they expected.

I do not in the least blame labor leaders and workers viewing with suspicion any new plan that is presented. Too many lemons have been handed out in the past, although sometimes the handers out really thought them oranges. Skepticism, investigation, experiment, trial, are justified, but not unintelligent opposition.

One labor leader on the platform with me made a great point of the fact that certain men on guaranteed day rates regularly paid had not earned a bonus. He seemed to think this was a defect of the system, not knowing apparently that no two babies, women, or men are exactly alike. After I had denounced piece rates as objectionable in practice and wrong in principle, another eminent labor leader, who has my highest respect for the great work he has accomplished, declared that an efficiency reward was piece rate in disguise, although every principle underlying the two methods is radically different.

Recently I spoke at the same meeting with scientific managers, and with an eminent labor leader. Said one of the speakers, "Managers are responsible for many of the evils that exist in plants. Conditions are not standardized. If there is to be greater output, and if it is in any part due to the intelligence and labor of the worker, he or she should receive increased reward and proper safeguard should be thrown about health and life. I am willing to suspend judgment and investigate." This was the labor leader, and I asked him for his coöperation and advice as to my work; one of my chief associates asked me for the privilege of seeking out and working with this man.

Said one of the speakers: "Common sense puts responsibility where it belongs, sets no definite tasks, encourages no special stunts, does not reward specifically any special stunts. It is evident that if there are twelve different items of cost and eleven of them can be lessened by scientific management, it must be for the purpose either individually or collectively of increasing human welfare, of paying more to the workers per hour. There is no possible escape from this conclusion. The public may receive all the benefit of waste elimination temporarily, financial backers may appropriate more than a fair return, but the men of all others who deserve immediate recognition are those who direct and do the work, who aid in waste elimination. Therefore, under the efficiency system the public may profit by lower prices, sellers may profit because of greater output and lower overhead charges, investors may receive larger dividends, but first and foremost, the man who has substituted brain activity for muscle activity ought to receive increased pay, and if it is withheld, efficiency is sure to decline because it is common sense as well as ethics that injustice and efficiency are incompatible."

Said the third speaker: " In England three hundred bricks are considered a day's work for a brick layer. Mittened apprentice boys have laid this number of bricks in cold weather in forty-five minutes. If for any reason it is desirable that no man shall lay more than three hundred bricks a day, if work must be made to reach around, if it is to cost as much as possible, well and good, let the man lay his three hundred bricks in forty-five minutes and go home, taking full pay and make place for another worker. The man will at least have more leisure, and the walls will go up in one tenth the time."

If the proposed economies of scientific management are attained by adding to the burden of the worker, I would denounce scientific management, as I have denounced long hours for day work, as I have denounced piece rates and other forms of stunt work.

Let us deal with this fallacy first by stating the universal law of efficiency. Every new operation begins with a maximum of effort and a minimum of efficiency. It progresses to pleasurable effort and best efficiency. It is in time forced to still higher efficiency at the expense of greater effort, and then a new method is substituted. Every one of us has experienced this law in his own life, and if we have not recognized it it is because we are perversely blind, not to say stupid.

The baby tries to creep, a new operation for it. It puts forth prodigious effort and is monstrously inefficient. It improves, the effort is lessened, the result is increased until it attains a very respectable and pleasurable crawl. It is inspired to attain higher efficiency, and it puts forth very much greater effort for very little better result; it becomes disgusted, it suddenly changes the method, rises to its feet and walks, aye runs for the joy of the movement. Running is easier than creeping and this law of progress is a universal law.

The man runner, the Indian or Egyptian sais increases his speed to five miles an hour. The prophet Elijah girded up his loins and ran before the chariot of King Ahab to Jezreel. It was hard work, desperately hard work for both the prophet and king's chariot, but the modern man speeds ten to fifteen miles an hour on his bicycle. This is not a killing pace, it is a pleasurable pace, although three times as fast as the extreme speed of continuous running. But this easy pace is not satisfying, so

the bicycle rider speeds up for a special stunt to twenty miles an hour for five hours. It takes him only one fourth as long as it would to have run the distance. But riding the bicycle at twenty miles an hour for five hours, although the extreme limit for bicycle riding is still not fast enough. Unnecessarily, serving no useful cause, simply because it is in him, he starts a six-day bicycle race, and in that time one man covers 1330 miles. This is not fast enough; it takes too much effort; so he develops the motor car, runs 1565 miles in a single day, six times as much as any bicycle ever did. He is not working as hard as the creeping baby did, and he is going 120 times as fast. He can keep it up one hundred times as long. He is one thousand times as efficient as the creeping baby. Even this is too slow, too limited, so he turns to the aeroplane and expects to speed one hundred miles an hour through the air.

The Mexican Aztec dug into the ground with a sharpened stick, cleared away the dirt with his hands, collected some silver ore. The work was very inefficient and very laborious. He invented a pick and shovel, dug down ten feet and pitched out the dirt. He had reached the limit, so he put in a notched tree trunk, filled the dirt into a leather bag and carried it out on his back. More efficient than scratching it away with his hands and feet like a dog, more efficient than pitching it out of the hole like an ant lion, but still most laborious. As the shaft grew deeper, the peon passed the limit of rational, pleasurable, and therefore profitable effort. Up one notched pole above another he would carry one hundred pounds of dirt from a depth of five hundred feet. What was more, if you, a mining expert, wanted to go down into that mine, you were strapped to a chair, he took the chair on his back, and down you went, notch by notch, a striking and visual demonstation of the old-time conceptions of the relation of manager and worker, the former taking all the risks, the latter performing hideously hard work. Probably the acme of human endeavor but not of human efficiency is reached when a 120 pound man carries a 180 pound man 500 feet up on a notched pole. The effort became too great, unendurable, also the risk—managers were occasionally dropped. So the method is changed, a crude windlass is improvised, men turn the handles at the top, they escape the necessity of lifting their own bodies, the effort is cut to one third for the same result. But in time

even this is too much, and so step by step we come to the modern method in which a skip loaded with several tons of ore, a skip on which manager and worker stand side by side, shoots up at the rate of eight hundred feet a minute, and if you don't look out you fly out at the top like a shot from a catapult.

I saw a coal tipple last summer capable of handling 25,000 tons of coal in twenty-four hours, more tons in a day than the peon would handle in his whole working life. The American miner works hard, but his work is child's play compared to the physical strain on the peon in the land of mañana.

Down into the last century galleys were propelled by slaves, chained to their benches and working the long sweeps. There they sat in their filth with a slave driver over them lashing their backs if they flagged. The galley slave was succeeded by the stokers in the ocean steamer, by the oilers and engine wipers. Their work was incomparably easier than that of the galley slaves. At first this new work was very hard and very inefficient. Steamers required ten or twelve pounds of coal per horse power. Steam engines were improved, they needed less coal, the Mauretania uses one ond one half pounds. This for a time helped the stoker. But larger engines were designed, larger furnaces built which gave the stoker more work and this work is now approaching the limit and automatic stokers already introduced into so many plants are in view. Ashes, formerly handled by man power and a windlass, are now automatically ejected without human muscular effort.

Mr. Stone, chief of the Locomotive Brotherhood, when speaking from the same platform with me before the Civic Federation, boasted that he had shoveled enough coal into a locomotive to cover two city lots. It is not a performance to be proud of. Had scientific management provided better furnaces and showed him how to fire better he would have shoveled only half the coal; some other fireman could have shoveled the other half; our natural resources would have gone further, and the days of the oil burner or the automatic stoker would have come sooner.

On a fast train and continuous run, the fireman's work is very hard. Mr. Stone rightly surmised that I would be incapable of performing it. But on the Santa Fé railroad running through Arizona I sat up alongside the fireman on a locomotive twice as large as any Mr. Stone ever regularly handled in his fireman

days, and as the fireman worked three injectors (Mr. Stone's locomotive used to have one), as with thumb and finger he regulated the fuel oil flow into the enormous furnace, he said to me: "As a fireman's job this is a cinch; no work about it at all." Then he reflected that this was perhaps not a prudent remark, so he touched me on the elbow and said: "But think of the added responsibility." He was right, there was added responsibility, but there was less work, and the pay was greater than the pay Mr. Stone received. I could have done it all day long. A twelve-year-old girl could have performed that part of the manual work.

In every department of human labor it is the same. Science has come to take the burden from the back, the sweat from the brow. We hurl back into the teeth of cruel Jehovah his curse. We shall not eat our bread in the sweat of our brows. Our men are no longer men of the hoe, first cousin to the ox, our women no longer wear out their lives grinding corn. Bread is furnished free in even the cheapest restaurants throughout all our land.

Scientific management, itself as yet but a crawling babe, not yet able to walk, has made a beginning, and if it were universally applied there need be no poverty anywhere.

There is no limit yet visible to the powers of man. We have reached out with our eyes until we made the distant stars our playthings. Read what Sir William James has written in his great work "The Powers of Men." "As a rule men habitually use only a small part of the powers which they possess and which they ought to use under appropriate conditions."

Says Mr. F. W. Taylor in his great work on Scientific Shop Management: "What the first class man can do, in most cases from two to four times as much as is done on an average, is known to but few and is fully realized by those only who have made a thorough and scientific study of the possibilities of men. It must be distinctly understood that in referring to possibilities the writer does not mean what a first class man can do on a spurt or when over-exerting himself, but what a good man can keep up for a long term without injury to his health, and become happier and thrive under." The first fallacy is that increased result, except for the moment, means increased effort.

The second fallacy is not so cruel, so ignorant, as the first. The greatest disaster that can happen the bread winner of the

family is to be thrown out of work. He can no longer go out and fish as the Eskimo do—he can no longer go out and hunt. Discharge in time of panic may mean starvation, and the heart of even the strongest man quails when he finds himself without work and gaunt women and crying children at home. Yet what happens under our industrial system without scientific management? In 1907 I was with the American Locomotive Company, counseling as to the introduction of modern methods. Suddenly the panic came, and of 25,000 men about 20,000 were let out. My job went with the others. The same thing happened at Baldwin's. There are only two large locomotive building plants in the country, and between them they turned adrift nearly 40,000 men.

One of the principles that scientific management is striving for is permanence of employment. On that same platform from which I spoke with Mr. Stone and Mr. John Mitchell, I advocated permanence of employment, even as I denounced piece rates as usually installed.

They told me I had no warrant to speak for the worker, yet Mr. Stone seized that occasion to praise as perfect, so perfect as to be incapable of betterment, the scientific management of American railroads. Great as are Mr. John Mitchell and Mr. Stone as leaders and as uplifters, they cannot set aside truths that apply equally to the microbe of infantile paralysis, so minute that it filters through porcelain, and to the stars, so remote that we cannot measure their parallax. It was the application of the first and the last of the principles of scientific management, efficiency reward, that induced a far western road last year to pay some of its men over $1,000,000 above current rates and to continue an industrial peace of six years' duration.

It remained for Mr. Morrisey to come forward with the fallacy that because the introduction of scientific management will mean less effort and less men, therefore it must mean a discharge of workers. You will note that Mr. Morrisey dreads it because he believes greater efficiency means less labor. They grant that greater efficiency does mean less labor, but it does not require the discharge of a single worker. We are, in this great country, so shy of workers to do the work that offers that we imported in the last six years over 4,000,000 foreigners. If we had had scientific management we would not have needed all those strangers who depress the wage rate. The railroad did not dis-

place the stagecoach and the canal in a day. For every man in the old occupation there are relatively to-day ten in railroad work. In going into plants to give common sense advice, all we have ever asked of the manager is not to replace men who naturally drop out. Scientific management cannot keep up with these vacancies. In a great New England plant the vice-president said to me, "We love our workmen. We do not want to discharge them." I agreed with him, but I asked him how many went away every year. He answered, at least ten per cent. Assuming that efficiency could lessen the number of his pay roll ten per cent a year, in three years it would make thirty per cent and no scientific management could keep pace with such reduction.

In this particular plant it was not among the employees that I looked for the chief savings, but along the line of increased efficiency of equipment. In England, in one of the large plants, all small pieces were forged rough and finished by hand. This took an immense amount of time. Hiram Maxim conceived the idea of drop forging those small pieces to size, but immediately the finishers rebelled. They feared it would throw them out of work; so finally the pieces were drop forged one eighth of an inch large and filed down by the finishers. It is because of this kind of Bourbonism—Bourbons never forget and never learn—that Germany and Japan are eating into England's export trade. England had the trade; she might have kept it if she had been shop efficient.

The savage mother is not afraid to teach her baby all she knows. The fox father teaches his little ones how to hunt. The savage father teaches his boys how to take over his man's work.

That civilization is rotten before it is ripe in which boys are not allowed to learn their father's trades, in which efficiency is dreaded because it lessens human toil.

Efficiency *

By James Duncan

First Vice-President, American Federation of Labor, and Secretary-Treasurer, The Granite Cutters' Association of America

The word "Efficiency" has been given a new meaning. Webster's International Dictionary in a general way defines it as "characterized by useful activity," and in mechanics as "the ratio of useful work to energy expended." The new meaning indicates that it is a synonym for sweating—not the perspiration brand, but that of getting something advantageous, as labor, from anyone by exaction, as "to sweat laborers."

Organized labor accepts and practices Webster's efficiency. We make it part of our mechanical efforts. We stamp it so indelibly in our economics that the purposes for which we organize into trade associations or unions set it forth among the objects for organizing, usually in some such language as this: "The objects of this association are to encourage a higher standard of skill, to secure adequate pay for work performed, to endeavor by legal and proper means to elevate the moral, intellectual, and social conditions of members, and to improve the trade."

To paraphrase these excellent morals into one word would spell "efficiency" in its purest, fullest, and best application. Evidently this is not what is meant or intended by the newly applied use of an otherwise very expressive word, for as the new notion is dissected, we find that it strikes at the very root of workshop ethics.

It temporarily offers blood-money, so-called, to the man being coached to exceed the task, also a bonus to the speeder or task-setter, but will result eventually in a reduction of the worker's wages. For a time the former is driven by the latter to exceed his natural ability to produce, and when all that is in him has thus been urged along, the result is pointed to as one man's output. Then a day's pay, with the employer's representative as judge of the amount, is placed upon it, and the task-setter who has gone the limit, as we say in the shop, is of no more use to the employer excepting perhaps to go through the same process with another victim. Thus we have, in a crude way, an introduc-

* Address before the Economic Club of New York, Monday, March 27, 1911.

tion to the two different kinds of efficiency which affect the part of modern industry under discussion.

I grant you this is not what is desired by the promoters of the new cult. No man has broader or deeper human sympathies than my friend and neighbor, Mr. Brandeis. If I may borrow a phrase, "he means well," but his environments have not permitted of his mingling in the output of the boiler and locomotive shop, the coal mine, the stone yard, or among iron workers on the twenty-fifth story of a sky scraper; consequently, his highly tensioned and imaginative brain weaves out a theory so pleasing in the conception, so tickling to the fancy and so idealistic in the motive, that the mere matter of it being wholly impracticable is forgotten.*

We are told that efficiency-management selects men who will find pleasure and delight in their work. Nonsense. Men's inclinations lead them to look for employment into which they put unrestrained will-power and delight; otherwise the management referred to would never meet them.

It is said that efficiency-management guarantees a basic hourly rate and gives higher pay from time to time. Possibly it might if those theorists who are evolving this scheme were also captains of industry, and did not change their minds in the transition from mental to material things, but in practice this is certain-

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*With reference to Mr. Brandeis' address printed on another page the author adds the following comment:

He suavely declares as if it were true, that we are yet laying bricks and cutting stone as was done in Pharaoh's time and after trying to read that grotesque statement into my argument, he proceeds to state that I, therefore, desire to continue old and effete methods of building construction. I deny the allegation absolutely. The only resemblance is that in Pharaoh's time bricks were laid and stones were cut but there the analogy ends. I object to having motives imputed to me which form no part of my position. Several of our large modern building firms would gather around them comparatively a few mechanics, and would build a duplicate of Cheops, the great pyramid, in much less than a presidential term. In order to help an entirely mistaken argument on his erroneous position Mr. Brandeis calls to his aid a skit from Kipling on building methods in London. If he desired to consult home talent he could with much effect, instead, quote from Montague's "New York in Motion":—

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Perambulating Wall Street, you cast a curious eye
Upon a rain of girders that hurtle from the sky,
You side step falling boulders, you duck a granite block,
You dodge a mass of iron and angle beams and rock.
And, piqued with passing interest, commingled with surprise,
You ask the next policeman what all this signifies.
"That shack," he says, "was only two dozen stories tall,
They're going to tear it down and put a building there, that's all."

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Reposing in your chamber at your brand new hotel,
At dawn you're roused from slumber, you still the clanging bell;
You hasten to the wall 'phone and grimly ask the clerk
If this unheard-of outrage is his especial work;
Politely he informs you to don your street array,
And get outside the building as swiftly as you may,
"We're tearing down the building," he says, "but it's all right,
We'll have a larger, better one upon the spot to-night."

ly not the result. Collective bargaining between employers and employees would accomplish more along this line in a decade than so-called efficiency-management could ever hope to accomplish, and the progress made would be by mutual and voluntary effort and, therefore, involve the highest principles of citizenship.

As an inducement, efficiency-management offers pensions to workers at the end of service. The thought is out of joint with the main question; in fact, belittles it. If efficiency so-called had played its part, as per its new definition, pensions would not be necessary, and the idea that they would be granted or available proves the inefficiency of the scheme, for if it contained the inherent qualities claimed for it, when the end of service came the workman whose labor had been so scientifically and energetically enhanced should be financially beyond the necessity of a pension. The appearance of the need of a pension, however, suggests that exploitation of the workman's chief asset might be expected rather than his exaltation.

We are not informed where the pension would come from, whether from the industry, the state, the nation, or from a fund created by those who had been speeded under the system. Moreover, it is not much of an inducement or incentive to a worker to inveigle him into a doubtful method of productivity to be worked to the utmost limit until he is unfit as a producer, and then to offer him a pension.

It is said that efficiency-management would give workmen many opportunities for promotion. To whom, and over whom? To the most capable, you say? Well, then, our trade agreement methods are ahead, as is generally true, for they provide a minimum wage rate and above this the extra skilled worker receives or should receive increased compensation, which points the way to promotion. The trade agreement also aims to put compensation for labor performed sufficiently high to place the worker, when he is no longer capable of being a wage earner, at ease, living on his savings and not dependent on a state or other pension, which, although welcome when needed, should not be considered by our boasted civilization as a necessity, and certainly would not be so considered if the worker we are discussing were given an equitable share of the market value of that which he helps to produce.

Again, efficiency-management claims it would "graduate effi-

ciency award to every worker from apprentice to president." We can imagine speeding the apprentice, but who is to speed the president that he may qualify for the extra award?

Any method of betterment should increase men's earning power, but seldom is the reward so generally visible as this new plan avers. Employers are human beings, no more and no less. They will not pay more in compensation to workers than they can help paying, and the scramble for jobs among the idle human beings militates against fancy or idealistic methods in industry. Both conditions combined send the wage rate down to a position where the resistive and collective force of the trade unions cries stop, and from this position they endeavor to build up in the eternal grind for betterment. And where their uplift is not visible, the wage rate is generally found to be below "a living wage."

Efficiency, so-called, admits that collective bargaining has done much toward increasing wages, but claims that it cannot offer a final solution of the labor problem, and gives as a reason that wages cannot be increased indefinitely. Will "efficiency-management" increase wages indefinitely? Besides, there is much doubt if there ever will be final solution of the labor problem, for contentions of this year affecting our industrial affairs will find accomplishment in a few years, and so on. The desire for betterment is a quality of the healthy mind; and the eternal source from which the desire for accomplishment springs, like to the inherent effort which causes the pursuit of happiness, is as near to the idea of perpetual motion as our finite mental status can comprehend.

We are told by "efficiency-management" that approaching industrial friction will hamper development, and that neither party (employer or employee) considers the interests of the other. This is theoretical misapprehension. Does not the modern trade agreement fully represent both? What else is collective bargaining? Each method recognizes the interests of both parties. Each method consists of definite, concrete, mutual contracts in which real efficiency is paramount, and in which, through the piece-work system, where it is in use, or in the establishment of a minimum day wage with compensation graded upward according to the earning power of the workman, efficiency is rewarded on a basis of mutual understanding; instead of the workman being goaded on by a speeding or tasking boss,

whose only ambition in the melee is to earn a percentage on his cunning in inducing the worker to overwork himself. Does our civilization require such an unnatural system? Are business methods in the workshops so lax as to need new tasking methods to require the worker to measure up to modern needs? Are the captains of industry so ignorant about economy in commerce? Are our workmen who are each producing a third more than similar workmen do in any other country where hand labor or hand and machine labor combined are features, so tardy or so trifling in their vocations? We answer emphatically in the negative.

That the cult in question is intended as a knock on trade-union efficiency, is noticeable in the efficiency-management statement that it would be better for the community at large for workmen to devote their efforts to the promotion of the speeding system and get their reward, than to trust to their unions to get and keep for them what the unions can get and keep for them. For further proof I refer to the following strong statement by Fred W. Taylor in "Shop-Management," page 1479. "When the workmen are convinced that a system is offered which will yield them larger returns than the Union can offer they will promptly drop the Union." This is meaningful but illogical. The workmen would still need the Union to guarantee them that the "larger returns" would be maintained. Those who doubt this know little of commercial manipulations. But my purpose just now is to prove that however plausibly presented the real purpose of these transcendentalists is to try to break up the Unions or to make their efforts nugatory.

We are informed that the piece-work system should be more in evidence. This is like unto a motorman telling an eminent surgeon how to properly remove gall stones. Practical men whose lives have been passed in a business and have abandoned the piece-work system because of its lack of real efficiency, especially in the quality of the output, need not to be lectured by a group of even well-intended theorists on the subject. The former know. The latter are not even good guessers on practical affairs.

We are told the efficiency-management "would eliminate the constant necessity for driving men." This would be great and grand if true. But, imagine, if you can, a speeding boss who urges a man along for all there is in him, even resorting to the bribe of a bonus, having eliminated the constant necessity for

driving men. Simple in words is it not? But, oh my, what a difference there is when you come to do it. Here again Mr. Taylor (Shop-Management, page 1480) does not leave us in doubt. Listen. "No workman could long resist the help and persuasion of five foremen over him. He will either do the work he is told to or leave." I agree with the alternative, he would leave. Who could bear the "persuasion" in question and live? Besides does not the cost of "persuading" also come out of the labor value of the victim?

But why practice this new theory on commerce alone? Management seems to be doing very well. It owns speeding autos, yachts, has fine residences and many servants, more or less efficient. It goes to Europe or the mountains in summer and to Florida and California in winter. It is sufficiently effective to form trusts and monopolistic combinations, through which fewer officers are required, and those who are essential are correspondingly higher paid. Studied along the line of elimination of competition and of increased compensation, it may be said to have shown such apt absorption of scientific efficiency as to make the newest crop of efficiency-managers green with envy.

The man behind the hammer does not desire to see a method introduced to overwork him more surely than grim competition has already done. He would rather welcome a new system to guarantee more steady employment, at a less rapid gait, with the attendant surety of better health and longer life, and he who can bring this about will be hailed as no one has been hailed since the Carpenter of Nazareth incarnated the great moral, "As ye would that others should do unto you, do ye also so to them."

But what about the professions? The new cult is mostly composed of lawyers, a few editors, and an unknown quantity called "intellectuals." Why not practice "efficiency-management" among those, and if it works well, others will copy it. Why try the experiment "on the dog" all the time? Begin with lawyers, for instance. What a field there is among the legal fraternity to practice efficiency-management! To them is attributable much of "the law's delay," the continuing of suits, the number of unnecessary or unwarranted indictments, and through the practice of cunning, sometimes the miscarriage of justice. They abuse energy and otherwise useful effort through following empty and meaningless customs and in saying and writing ancient and use-

less phrases. They waste more time and money in following antiquated methods, by which judges and lawyers more seriously interfere with the administration of justice and the attainment of equity than is evident in any other phase of business life. Let them get task masters on efficiency who will speed them along on thought and action, not forgetting the promise of a bonus. The saving to business pursuits generally would, I feel sure, soon exceed the enormous daily saving through "efficiency," on the railroads of our great country, the announcement of which quite recently took our breath, until we were assured by railroad magnates that the statement was a pipe dream.

The expounders of the new scheme inform us that "the task given to a man is based on a detailed investigation by a trained expert on the best methods of doing work, and the task setter acts as instructor." As a skilled workman I want no task nor task setter to harass me at my work. That would rob me of my individuality and self-reliance and would reduce me to an automaton.

Alongside of this doubtful theory Organized Labor places its efforts at efficiency and invites close comparison between the two systems. Industrial and economic progress depend more upon education and a clear, well-nourished brain than upon any system of speeding that could be devised, and Organized Labor is foremost in support of our public schools. We believe in school-room education as well as in workshop education. We favor industrial education, and have called for the enactment of state legislation to permit of the high school preparing men and women for industrial pursuits co-equal with the high school education guaranteed at present to those who propose to enter the professions. We also favor industrial night schools where workers can receive education that will develop their minds while their hands are being trained in the workshop. Our methods, we believe, are superior to the new scheme. They make for welfare and good citizenship.

We are opposed to the speeding system in its application to the workshop, and claim to speak with more authority on this than on changes of executive methods in the management of great enterprises. We see nothing in the speeding system but an effort to turn manual laborers into specialists, each performing a certain task month after month as a wheel in a machine performs its part, the monotony of which, especially when men are driven to

high speed, would drive them to the verge of insanity. If any of you ever passed an hour in a sweat shop (as visitors, I mean) in the clothing business, where specialization perforce is practiced, you will have an idea of our conception of what is being preached to us in the way of efficiency-management. We are not mere machines; we are human beings and protest against being discussed and considered as co-equal with machinery. The claim that a worker who has become expert in one portion of an industry, and who has become so through great mental and physical strain, would more quickly become an expert in any other employment, is against everything experience has yet indicated. In fact, specialists are usually unfit for anything else than the work on which they become expert, and when anything happens to deprive them of employment, they invariably fall into and increase the ranks of the unemployed.

The whole scheme of efficiency-management is a beautiful theory, but is wholly impracticable. It is nerve-racking and wage-reducing, and unless something better can be brought to the relief of the already overworked wage earner in the way of real efficiency, please rather help him along in collective bargaining as practiced under trade agreements, which grades his wages upwards from an acknowledged minimum rate. It stimulates the worker to rational effort and to free will activity born of an inherent desire to do something, unharassed by a speeding boss, for the welfare of the human family, instead of being speeded for a bonus with the assurance of an early death.

Instead of demanding your pound of flesh from us, aye, even the last drop of blood in your pound of flesh, in the eternal grind for so-called efficiency, why not try another kind of speeding—seeing, for instance, that workmen are well fed, well clad, well housed. Sufficiency in these particulars would certainly induce natural and earnest efforts towards plentiful output and good quality.

This new scheme proposes to foist upon us a whirligig of motion equal to the rhythmical turn of a wheel in a machine, but in addition to increase those motions seemingly in mathematical ratio. What does all this mean? Have workmen in the past been idlers and their employers fools? Some may have been, but they are exceptions—just as we have had bum politicians, shyster lawyers, dishonest office holders, and frenzied financiers who fluttered for a time and then were forgotten—but the general

run of employers and workmen are not the fools and idlers this passive cult would have you believe.

May we not for a moment view our subject from a different angle? What say you, my theoretical friends, to putting your scheme into use where it may do real, and, let us hope, permanent good. What stable industry most needs is steady employment for workmen. To them the fear of losing their jobs is a veritable hell upon earth. If, therefore, you can speed, instruct, influence, or legislate management into efficiency in this direction, our hats will come off to you. Start, for instance, with the hard-coal regions of Pennsylvania. There thousands of workmen go deep into mother earth to clip coal from its fastenings, primarily to supply a commercial as well as a household commodity essential alike to business and to comfort, but really to increase the large incomes of haughty coal barons, who in their lurid outbursts of pathos and alleged responsibilities even claim partnership with the Deity, yet who prevent the miners from working beyond two hundred days in a year. Statistics show their working days per annum to be from 188 to 212. Now, then, if a change to about 300 working days were given them, two great blessings would be evident: their earning and producing power would be normally enhanced, and the price to the consumer of anthracite coal would be reduced. The former would be a human and the latter a business virtue, and here again is a chance to boom an experiment in efficient-management.

In the clothing trade, men, women, and children are "sweated" for months; then go idle for months every year. Why not instill your efficiency into better management in that industry? Coming back to the subject proper, we may be told we do not understand the new scheme. Our reply is that we believe we understand it thoroughly, and we also believe we know what the net result will be, but our academic and zealous friends understand neither us nor workshop tactics. They want to further exploit labor; we want to further exalt labor, and in pursuance of the latter we will in the future, as in the past, embrace every practical means to the desired end, but the notion with which we are just now confronted aims at "remaking" workmen in a new mold, trimmed, polished, with bulging muscles, swift of hand and foot, improved eyesight, shop value seventy-five per cent more, acute, docile, accepting and being governed by thought from the speeding boss, and for what? We repeat, for what?

The New Conception of Industrial Efficiency*

By Louis D. Brandeis

As I look at the watch I feel a greater regret at the brevity of life than ever before; because there has been said by some of the speakers who preceded me so much that was not true, and so much that shows a failure to understand what scientific management is that I should like to enter upon such a statement of that science as would make it possible for every one of you to know what it means, and what it offers to this country; what the introduction of knowledge as opposed to ignorance offers to the great world of human industry. It means the opportunity to secure in a much-neglected field advances in production which would enable our people to satisfy those just demands of labor, the satisfaction of which is essential to the development of American civilization.

I am amazed to find a representative of organized labor as able and as enlightened as Mr. Duncan, taking, in ignorance of the principles of scientific management, the position which he has. It is a position which must necessarily rest, if it is to be taken literally, upon the proposition which belies everything upon which American prosperity rests, and which is necessary, and has been necessary for that prosperity which we enjoy. It is as if he said we can not make progress.

Isn't it a fact that the prosperity we have in America to-day comes not so much from illimitable, or so-called illimitable resources of America, as because we in America have advanced—or had until recently advanced—beyond all other people, in eliminating the waste of human labor? That is what we stand for. The prosperity of the South began with the cotton gin. The prosperity of the West lay not so much in her fertile fields as in her agricultural machinery, and in her transportation system, which enabled us to eliminate waste, to create a field for profit out of which we, and all of us, were able to get a living, better than was obtained in foreign countries. In our New England, and in parts of the East where manufacturing prevails, it has been our necessities, and not our resources that have been the sources of prosperity. It has been the necessities, the poor soil, which drove us to manufacturing, and high wages, fortunately,

* Address before the Economic Club of New York, March 27, 1911.

which made us the Mother of Invention. Unfortunately that movement to invent, to save labor, was arrested. Why? Because of the illimitable resources of foreign labor. It was easier to tap the foreign labor supply than to think, and to work persistently upon the lines of saving labor.

Mr. Duncan speaks with joy of his knowledge of the building trade. I was reading the other day a poem with which I dare say many of you are familiar, a very recent poem by Rudyard Kipling on the bricklayer. It seems to me extremely apt in this connection.

> I tell this tale, which is strictly true,
> Just by way of convincing you,
> How very little, since things were made,
> Things have altered in the building trade.
>
> A year ago, come the middle o' March,
> We was building flats near the Marble Arch,
> When a thin young man with coal black hair,
> Came up to watch us working there.
>
> Now there wasn't a trick in brick or stone
> That this young man hadn't seen or known,
> Nor there wasn't a tool from trowel to maul,
> But this young man could use 'em all.
>
> Then up and spoke the plumbers bold,
> Which was laying the pipes for the hot and cold,
> "Since you with us have made so free,
> Will you kindly say what your name might be?"
>
> The young man kindly answered them,
> "It might be Lot, or Methusalem,
> Or it might be Moses (a man I hate)
> Whereas it is Pharaoh, surnamed, the Great.
>
> "Your glazing is new, and your plumbing is strange,
> But otherwise I perceive no change,
> And in less than a month if you do as I bid,
> I'd learn you to build me a pyramid."

Now, gentlemen, is that something to be proud of? Is it something to be proud of that bricks were laid, and in most countries are being laid, precisely as they were laid in the days of Pharaoh? No! Mr. Gilbreth, after he had studied Mr. Taylor, came to think whether the principle which Taylor had applied to the machine shop and other things could not be applied to

bricklaying. What did he do? He did just what Taylor had done. He put the mind of the scientist on to the operation. The great fundamental work of the scientist is to observe—observe and take nothing for granted. So Mr. Gilbreth, who is a bricklayer by trade, who fitted himself to that as he did to other branches of the building trade, began to dissect this operation of laying brick. He began at the beginning, and said, "What is the first thing I do?" Well, the first thing was to reach down to the floor or the scaffolding and pick up a brick; and it occurred to him, for the first time, although he had been in the building trade for nearly twenty-five years, that it was a fool thing for a man to bend down to the floor to pick up a brick. It took a good deal of effort. It took a good deal of time. He said to himself, "The thing for me to do is not to go down and pick up the brick, but to have that brick up where I am, and to have it where I can just reach out my hand and get it." He said it will save me a good deal of labor, and it will save me a good deal of time. So he invented a shelf—it was a very slight invention—he arranged that it could be screwed up from time to time by a boy who passed around, so that the brick would always be up at the hand of the man who has to lay it. He would simply have to stretch his hand out, instead of going through the athletic performance of picking it up off the ground. Then he said, "What is the next thing I do? I take that brick in my hand, and I take my trowel and test it two or three times. If it is not a good brick I take it and throw it down on the floor. I am up on the fifth or sixth story. Those bricks which have been painfully and expensively brought up to where I am are painfully carried down again. Wouldn't it be better to have only those bricks come up that are selected instead of being pitched on the hod, or raised by the derrick, and sent up without being tested?" He concluded that would be economic. Then he said, 'What is the next thing I do? I look that brick all over to get the face of that brick and to get it just right. Wouldn't it be better when that man down below is selecting the good brick, before it comes up to me, that he should put those bricks in a packet right side up, so that when they come up they will be delivered right side up, right on this shelf, right at hand. All I would have to do, I, the bricklayer, would be to take each brick, knowing that all bricks were sound, and knowing all were right side up, is to

lay it." Then when the time came when he was ready to lay it, he put it down on the wall; then he tapped it with the trowel again (that had always been done since the days of Pharaoh.) It occurred to him that perhaps that was not necessary. If the mortar was just of the right texture, the weight, the known weight of the brick, would be sufficient to press the mortar down to where it belonged. In that way, with some other changes, he found that the eighteen motions which were ordinarily involved in laying a brick could be reduced to six.

Now I want to ask you gentlemen whether that method of laying brick is not more in accord with the ideas of America, and the Twentieth Century, than the methods of Pharaoh.

What Mr. Gilbreth did with brick has been done in many other industries. It must be done in thousands and tens of thousands, and hundreds of thousands of operations, before we reach what? Before we reach a right way of doing things. And to learn the right way of doing we must do just what the scientists have always done, in all other fields. To observe! To study! To test! To look at every operation, and everything that exists with the eye of a skeptic, or the eye of a Missourian who wants to be shown! That is what he does. That is what Taylor did. That was the method which Taylor pursued. One of the first things he did everyone doubtless at this time is familiar with. He found out how to do the simple operation of loading pig iron from the yard into a railroad car. He increased the performance of the individual man from twelve and a half tons up to about forty-seven tons. Did he do it by speeding up? Not at all! He did it by precisely the same methods as are pursued in the careful training of a man to do any work. He found out how to do it. He found out the laws that govern it. He gave careful thought to the individual. He said that this man who picks up the pig iron and carries it into that car, if he doesn't know how to do it best, will be just like the man on the college crew who wears himself out when he gets into the boat. There is some speed which is the best speed for that man to go. So fast, and no faster. There is a certain period that man ought to rest in order that he can work the full eight hours or nine hours in the day. There is a certain angle which is the best angle for that man to walk up the inclined plane from the yard into the car. By studying those things he finds out there are

laws, there is a science, in much that has heretofore been regarded as unskilled and unscientific. The great aim of scientific management is to establish that there is to be nothing unskilled—nothing that is not to be worked out, as scientists are working out for us day after day the problems in other departments of human activity.

If Mr. Duncan and his friends would come to understand what scientific management means, he would see how important it is to the working man, and to us, because we and they are all together. Mr. Fagan talked as if the railroads were opposed to this idea of efficiency. Mr. Willard's letter shows you that is not the fact. What say you to this as a proposition? "Let things be cheap, and men and women and children more valuable. Let there be more abundance for the many. In this principle of efficiency is bound up the welfare of our race." That, gentlemen, is a quotation. Those words were spoken within a fortnight, in this city, by Frank Trumbull, Chairman of the Board of Directors of the Chesapeake & Ohio Railroad, three weeks after the decision of the Interstate Commerce Commission denying the advances in freight rates which the railroads of the country had sought. Isn't that a platform on which every man and woman here can stand? Isn't that the only platform upon which we should stand? Isn't waste sinful, however it may come?

In whatever quarrel, whatever controversy there may be between organized labor and employers, I think Mr. Duncan well knows that I have stood, and stand, strongly for organized labor. Isn't that so, Mr. Duncan? (MR. DUNCAN: That is true.) Those controversies exist, and should exist, because both sides of every problem of every kind should be represented, but in those controversies, the controversies should be how shall profit be shared between employer and employee and community—not whether there shall be gain. Every economy is gain, and the only question that can arise properly whether it be with organized or unorganized labor, is whether the gain which is being made is being properly divided among all who are interested in it. I say, therefore, when these engineers point out methods of saving and they have pointed out extraordinary instances, the possibility ought not to be carped at. We have not made the successes we have in America through the pessimist. We have not made the successes by men showing us what we could not do. It

is by men showing us what we can do. All deeds that were dreamed of have been done; but deeds that were never dreamed of will yet be done.

We cannot satisfy the demands of American Democracy until we have eliminated a large part of the waste which now exists. The talk this evening has been as if that waste lay wholly in what is here spoken of as efficiency or inefficiency of labor. That tells a very small part of the story. There is a very large part of this possible saving that organized labor or any tenet of organized labor cannot possibly be opposed to. Take this illustration from the railroad world. Last year, less than a year ago, the superintendent of motive power of the Erie Railroad, Mr. Hayes, pointed out at a meeting of his associates what might be done in the saving of fuel. He showed the tests which he had made upon his own railroad in the operation of a particular engine, and on a particular division, by the same fireman and engineer in two successive hours. In the first hour that fireman and engineer were operating that engine without any special care as to the consumption of fuel. In the second hour a trained man got upon that engine with them and saw to it that they operated the engine, and stoked the fire as it should be stoked. The result was, as Mr. Hayes pointed out, that although the work actually done in the second hour was greater than in the first hour, the consumption of coal was only one third of what it was in the first hour. All that extraordinary saving resulted from knowledge and care.

Does Mr. Duncan or does any man believe that it is better to go on in the old way allowing the men to waste that fuel instead of seeing to it that the men who fire that engine and who run it should have some regard for the laws of combustion, and the laws of economy? Fuel in this country costs the railroads Two Hundred Millions of Dollars per year. Probably from one fourth to one half of that fuel could be saved simply by securing from the men—in the first place giving the men knowledge, and in the next place inducing them through some proper incentive—to save instead of to waste that fuel. In one of my arguments I referred to Mr. Hayes's testimony in regard to what he found to be possible. That was an argument before the Interstate Commerce Commission. A few days afterward I received a letter from a man who had formerly been a fireman,

and who had formerly been an engineer, who told this story. He said, " When I went onto an engine as fireman, I was a weak boy, but I needed that money, and I wanted it, and I went there; but it was an awful job for me to do all that shoveling. I began to think whether or not it was necessary. I began to think, too, that that engineer was putting a good deal of work on me that he oughtn't to. I thought I found out a few things about firing an engine, and I made up my mind that when I became an engineer I should not work my fireman as I had been worked." Later that man became an engineer and it was discovered three years after he had been in that position that on his engine he saved forty tons of fuel a month as against those around him. He says that in all the years that he was there as a fireman and as an engineer, and until this discovery was made at that late day, he had never heard one man suggest to him that coal was something to be saved, and but for that experience and that study which he individually made, with a view to saving himself labor, he never would have known how to save coal. It has been said by the efficient engineers that scientific management, that the study of these problems would give joy to work, but Mr. Duncan here scoffs at the idea that a man can get joy from his work in any such proceeding. I want to read you a few lines from a letter which that fireman and engineer wrote to me. He says this: " Through my four years and one half of firing experience, and my first three years as locomotive engineer, I remained in ignorance of the principle underlying the generation of heat by combustion of coal, and the formation of steam, and its economical use. Then came an awakening of intelligence through study of the cycle of operations involved in the process of turning heat into work through a steam engine. I found the awakening of myself the most delightful experience in my life, and I have always believed that it must be more or less delightful to every normal man properly interested in his work, to learn not only the best methods of doing, but the science which makes clear the reason why such methods are the best. No man can be made perfect in his work until he has had this full knowledge, imbibed with the sincere desire to improve his methods to perfection. So I am glad that your argument included an appeal for the proper education of the men in railroad service, for their own good, for their own happiness, and thus contribute to the welfare of the country."

Now I ask you whether that engineer and fireman is not a truer American, and does not hold up a higher ideal for his fellow workmen than the man who comes and tells you, "We know it all. We will not listen to advance. What we do not know is not worth knowing." I ask you, gentlemen in business, and in manufacturing, whether the thing you do not know is not just the thing that is worth knowing?

I sympathize absolutely with the apprehension of Mr. Duncan, and his associates. I believe that we have in this country a situation which presents much that we can be proud of, much that we must be ashamed of. The richest country of the world, the country of greatest opportunity has in it horrible conditions, in very many places, and in very many trades—excessive hours, insufficient wages, conditions dangerous to life and health, and conditions which would be infinitely worse if it were not for labor's steady and progressive fight through the labor unions. But while the unions have done and are doing a great work, they stand not only in their own light, but in our light, and in the light of the democracy and the advance of the world, if they undertake to block the introduction of science in business.

Mr. Duncan closes with the suggestion "What more, what better could be done than to undertake to make work regular, instead of sporadic." I agree with him. Of all the disadvantages under which labor suffers, of all the chaos in industry to-day, there is nothing which in its results is as deplorable and as disgraceful as irregularity of work; and the first task, the great effort of all scientific management must be to make work regular.

In one business, one business with which I became very familiar, where the principles of scientific management were introduced, that was the great aim to which they directed themselves, and it led to all the rest. It produced from an irregularity comparable to that which Mr. Duncan spoke of; of two hundred working days in the year, a regularity where the actual working days ran up to the three hundred working days which Mr. Duncan desired. That was by virtue of planning; by virtue of introducing into every department of that business careful thought, the best effort that could be had, to devise what everybody must see is desirable, that there should be no waste. What waste is comparable to the waste that brings the pain and demoralization of men dismissed and thrown into the street to "kill time" as

best they may until again in the chaotic condition of that business there is a demand for a great number, and they run overtime!

But this attitude which Mr. Duncan shows, and in which organized labor approaches this plan, saying, "You sha'n't do that; you shall proceed as you have proceeded," is the opposite to what we strive for. We should pick out every defect, whether it be irregularity, or waste, or whether it be overtime, or any one of a thousand other defects, and let the mind of man dwell on it, not in the sense of despair, like Mr. Fagan, but in the same view in which everything has been accomplished—with a sense of hope and certainty that the future has in it things better than the present, that same hope which created and has given us the great railroads which cross the continent to the Pacific. What we need is that. We need the open mind, as well as courage. We need patience. It will take a great deal of patience to deal with the individual. It will take a great deal of time to bring about these changes, and the work will never be done, as the work of inventing machinery is not done, and we hope never will be done. But for us, the thing for us to do now is to enter upon it. The thing for organized labor to do is not to stand in the way of the employer, the railroad manager, or the manager of the factory, but to join with him, saying, "We will economize, we will aid you in every conceivable way; but we will use that force, that power which organized labor has, to see to it that we get a fair share as the community shall get a fair share, and as the employer shall get a fair share, by each of us striving, putting before each of the others, the right view, or what seems to us right, what seems to us fair, and thus we shall attain as near to justice as it is possible to attain in this imperfect world."

Evolution of the Machine Unit System at the Modern Electric Co.

By D. Carl Eggleston, M.E., C.P.A.

Member Am. Soc. of Production Engineers

Some thirty years ago Messrs. Burt and Fair* commenced repairing Bell telephone apparatus in Chicago. Later they began the manufacture of telephone instruments, and after a few years the business was incorporated under the name of the Modern Electric Co. This company has grown until it now has over twenty-five thousand employees on its pay roll engaged in the production and distribution of

Telephones and Transmitters,
Switchboards,
Sub-Station Apparatus,
Subscribers' Sets,
Power Apparatus,
Telegraph Instruments,
Lead Covered Cable,
Line Material and Apparatus,
Repair Work,
Batteries and Supplies,
Backboards, Battery Boxes and Remade Subscribers' Sets.

The system of manufacturing parts in large quantities, to be assembled later into the finished product is extensively followed. Control over production is secured through a complete cost-accounting system that is interesting because of the scientific way in which the costs are handled.

Factory Expense and Labor Analysis

At the Modern Electric Co. an experience table was prepared from an analysis of factory expense and productive labor covering a period of several years. The Detailed Analysis of Factory Expense was sub-divided as shown in Chart A.

In order to show the relation of expense to productive labor more clearly a graphical chart was drawn up from the records of past experience. A glance at Chart B shows that there is no

* The names are all fictitious.

DETAILED ANALYSIS OF FACTORY EXPENSE

Year.	Dep'n	Insur	Taxes	Light	Rent	Power	Administ	Tools	S'dry	Material Expense	Draft'g Expe'se	Special Dept Ex	Total Expense	Prod. Labor
1890	$1,011	$106	$150	$851	$2,200	$4,415	$1,500	$436	$122	$2,128	$345	$2,447	$15,750	$22,000
1891	988	104	150	832	2,200	4,316	1,500	426	119	2,080	338	2,392	15,600	22,200
1892	950	100	150	800	2,200	4,150	1,500	410	115	2,000	325	2,300	15,000	20,000
1893	940	98	150	790	2,200	4,095	1,500	400	114	1,950	321	2,355	14,900	19,700
1894	982	104	150	820	2,200	3,950	1,500	420	117	2,048	332	2,336	15,350	20,500
1895	962	101	150	786	2,200	4,215	1,500	416	116	2,032	330	2,208	15,400	20,500
1896	912	96	150	780	2,200	3,985	1,500	394	110	1,920	312	2,300	14,500	18,300
1897	855	91	150	741	2,200	4,074	1,500	378	107	1,842	297	2,062	13,500	16,800
Total	$7,600	$800	$1,200	$6,400	$17,600	$33,200	$12,000	$3,280	$920	$16,000	$2,600	$18,400	$120,000	$160,000

CHART A

direct relation between factory expense and productive labor. However, during the period covered by the chart the average expense is shown to be seventy-five per cent of the productive labor.

From a knowledge of past conditions and of anticipated business it has been possible to determine what the relation of factory expense to productive labor is going to be in the future. Then on coördinate paper the expense has been plotted as abscissas and the labor as ordinates. For the most part expense and labor curves have been plotted as straight lines at the Modern Electric Co. Reference to Chart C shows that the Line OB, which is drawn to represent the relation of expense to labor, cuts the coördinates at a slope equal to the anti-cotangent of A standard. This is called a Standard Line, and shows the relation of factory ex-

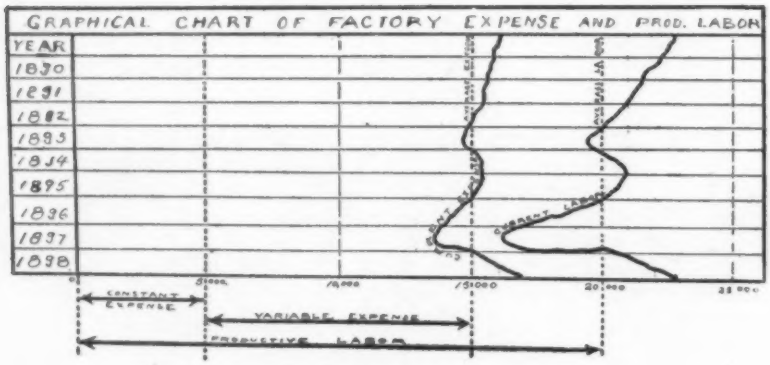


CHART B

pense to productive labor for a period of many years. However, conditions are sure to change from time to time, which affect the relation of factory expense to productive labor.

It is a well-known principle of factory operation that expense does not vary directly with productive labor because of so-called constant charges which remain fixed for a given factory, irrespective of the volume of output. Reference to Chart B shows the amount of constant expense to be one third of the normal factory expense. Therefore a line drawn to represent current conditions cuts the coördinates at D, a distance from the origin O equal to the amount C, of the constant expense in Chart B. This line crosses the coördinates at a slope equal to the anti-cotangent

of A current, as shown by line DE. This is called a Current Line, because it represents the relation of factory expense to productive labor under current conditions. It is obvious that at some point

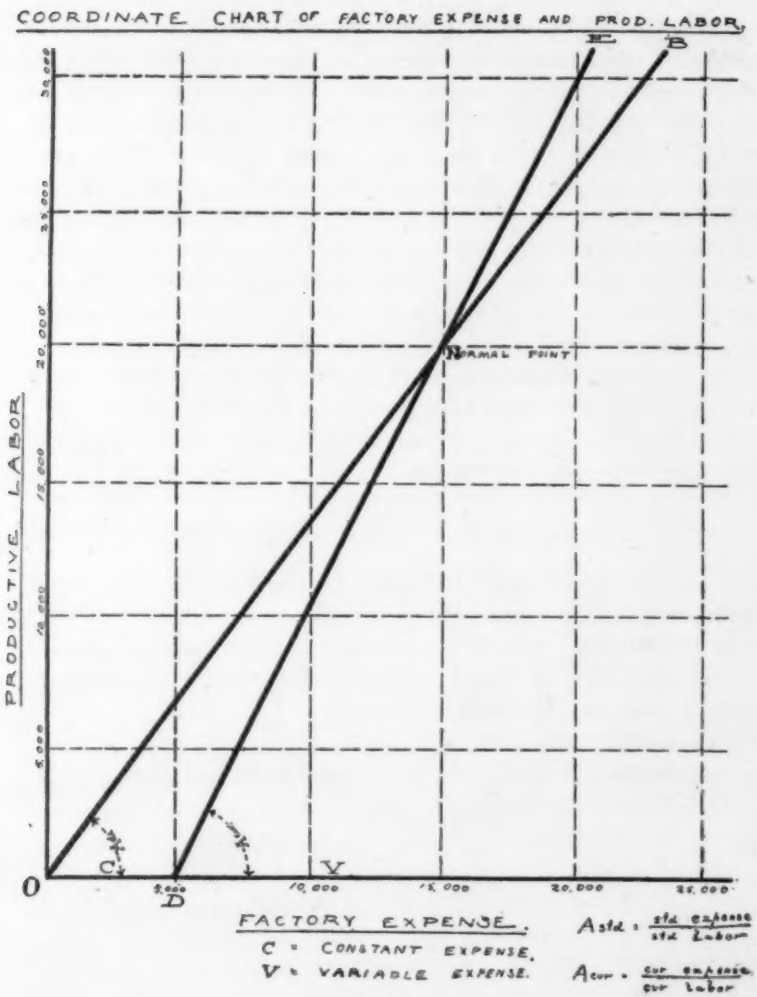


CHART C

the Standard Line intersects the Current Line. This happens when the equations of the two lines coincide at the Normal Point. At this point the ratio of factory expense to productive labor

is seventy-five per cent, but at any other point on the Current Line it is different.

Burden Distribution

The customary machine shop practice is to analyze the expense by departments and arrive at the proper percentage for the distribution of burden in each. Such was the method first employed by The Modern Electric Co., but as usual it gave unscientific results, a job done on a small lathe carried as much burden as one done on a large lathe, when the operators were paid the same rates. This, of course, resulted in wide fluctuations in the cost of similar articles, and so the Machine Unit System was installed by which factory expense is disposed of as a burden on labor by the use of hourly machine rates. Thus the amount of operators' wages does not affect the amount of burden applied on a job. This is the only logical method of burden distribution in machine shop practice, for as has been pointed out in Chart B, expense does not vary directly with labor, because of the so-called constant charges.

Standard Machine Classifications

The first step in the introduction of the Machine Unit System was the standardization of the machine classifications. For in this system departmental classifications are disregarded and machines grouped according to arbitrary standards. The main productive machine classifications were:

Lathes,
Screw Machines and Miscellaneous Lathe Types,
Milling Machines,
Drill Presses,
Grinders,
Buffers and Polishers,
Tappers,
Punch Presses,
Shears,
Metal Shapers,
Metal Planers,
Hammers,
Metal Saws,

Sheet Metal Rollers and Formers,
Furnaces, Forges, and Annealing Machines,
Anvils and Surface Plates,
Jointers and Planers,
Molders and Shapers,
Sanders,
Wood Saws,
Mortising and Tenoning Machines,
Bench Work.

The sub-classifications of the first group were:

Turret,
Engine,
Tool makers and Precision,
Rapid Reduction,
Hand and Speed,
Wood Turning,
Backing Off,
Gear Cutting,
Gap Engine.

Finally detail-classifications were made, as shown by those following for Turret Lathes.

	SIZE OF STOCK	SWING	LENGTH OF BED
Turret Lathes.....	½″ x 10″ to 1¼″ x 10″	10″ to 14″	4′ to 7′
" "	1¾″ x 8″ to 2½″ x 12″	15″ to 18″	7′ to 10′
" " (Heavy Type).	2″ x 24″	12″ to 16″	8′
" " " " .	3″ x 36″	19½″	9′
" " " " .	12″ x 40″	21″	9′

Classifications were provided for all of the machines at The Modern Electric Co., according to capacity. The description required of each machine was also standardized. Thus for lathes the following information was considered necessary:

(*a*) Manufacturer's name and type number,
(*b*) Style of machine,
(*c*) Size (total length of bed x swing).

The non-productive machines (those the time of which was not chargeable to a specific job number) were classified as follows:

Cranes, air hoists, jib and hand swinging cranes,
Tracks, trolleys, and I beams,
Ovens and furnaces,

Tanks, kettles, pots, and vats,
Testing apparatus,
Gas piping, meters, and fittings,
Blast piping, blowers, and fittings,
Blower system for shavings and sawdust,
Ventilating system.

In all cases the use of the non-productive machines was specified as where they were used in connection with some productive machine.

Detailed Analysis of Machine Expense

In connection with the Machine Unit System, it was found necessary to make a detailed analysis of those items pertaining to machinery, separately from those pertaining to material, drafting, and so-called special departments. Machine Expense at The Modern Electric Co. is that which is incurred by regular manufacturing departments, and which is disposed of by the use of hourly machine rates as a burden on labor. The following chart shows the various classifications of expense and also the units used for assessing machine expense against machines. From time to time, of course, the rates have to be revised, but so far as possible they represent normal conditions so as to give standard costs.

Hourly Machine Expense

It is now an easy matter to show what the hourly machine expense is. This is arrived at as illustrated in Chart E. From the plant records the face value of the machine shown is found to be $2,000. The rate of fixed charges on machinery is shown to be ten per cent in Chart D. Hence the fixed charges on the unit in question are $200.00. The machine obstructs approximately five hundred square feet of floor space, and so it is assessed rent at the rate of $0.25 per square foot, which gives us $125.00. Proceeding as illustrated in Chart E we find that during a year the normal machine expense amounts to $1,040.00.

During the progress of the installation of the cost system herein outlined, records were kept of the hours each machine was operated. From these records it was possible to find the hourly rate of expense by dividing the yearly amount by the hours of operation. In the case worked out in Chart E the hours of oper-

DETAILED ANALYSIS OF FACTORY EXPENSE

Machine Expense			Rate	Units	Kind
Depreciation	$950				
Insurance	100				
Taxes	150				
Fixed charges		$1,200	10%	$12,000	Face value
Light	$ 800				
Rent	2,200	$3,000	.25	12,000 sq. ft.	Floor space
Power		4,150	.04	103,750 K.w.h.	K.w. hours
Administrative		1,500	50.00	300	Operators
Tools Class a		410	65.00		On Class a
" " b			70.00		" " b
" " c			80.00		" " c
" " m			85.00		" " m
" " z			100.00		" " z
Sundry Class a		115	14.00		On Class a
" " b			20.00		" " b
" " c			22.00		" " c
" " m			27.00		" " m
" " z			32.00		" " z
Total machine expense		$10,375			
Total material expense		$2,000	12½%	16,000	Cost Price
Drafting expense		325	.07	4,643	Hours
Special Dept. expense					
Foundry		$1,400	.02	70,000	Pounds
Dipping		100	.005	20,000	Pounds
Plating		250	.06	4,166	Hours
Lacquering		125	.04	3,125	"
Japanning		200	.60	3,333	Labor
Eng. exp. room		225	.40	562	Hours
Total Spec. Dept. exp.		$2,300			
Total factory expense		$15,000			

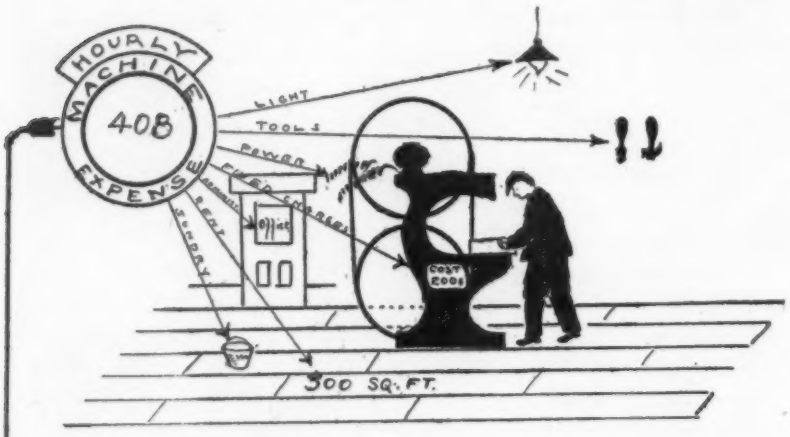
CHART D

ation were twenty-six hundred, which gives an hourly expense rate of $0.40, as shown.

Material Expense

All expense at The Modern Electric Co. is not distributed by using hourly machine rates, and so we will consider the method

of handling expense incurred in the purchasing, receiving, inspecting, handling and storing of materials both raw and in process of manufacture. Reference to Chart D shows material expense to be equal to twelve and one half per cent of the cost of material purchased. By adding to the cost of material in a job



ANALYSIS OF HOURLY MACHINE EXPENSE

Classification	Unit	Quantity	Rate	Amount
Fixed charges	Face Value	2000	10%	200
Rent & Light	Square Foot	500	.25	125
Power	K.W. Hrs.	1465.0	.04	58.6
Administrative	Operators	1	50.	50.
Tools	Class a		65.	65
Sundry	Class a		14	14
TOTAL:				1040
Normal Hours of Operation				2600
Hourly Machine Rate				.40

CHART E

one eighth of its cost the material expense is distributed. A moment's thought will show that this is the only scientific way of handling this class of expense items. What it costs to maintain productive units and what it costs to care for stores are obviously two different things.

Drafting Expense

At The Modern Electric Co., orders are issued to the drafting department for doing work like those to any manufacturing department. Draftsmen charge time against orders and drafting burden is applied on the basis of the number of hours worked. The total drafting labor and burden charges appear as drafting expense in the cost analysis.

Special Department Expense

There are a number of departments in a machine shop of any considerable size, which it is generally necessary to study in

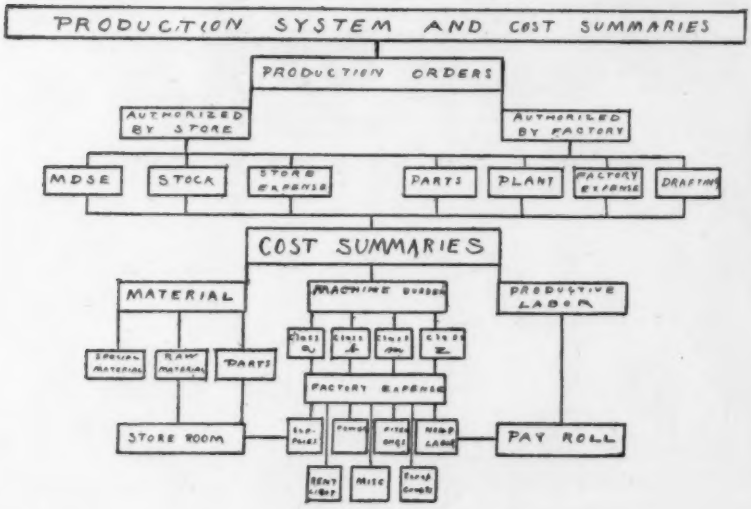


CHART F

detail and to use special methods in the distribution of burden. Such are the foundry, dipping, plating, lacquering, japanning, and engineering experimental room, as indicated in Chart D.

Cost Formula

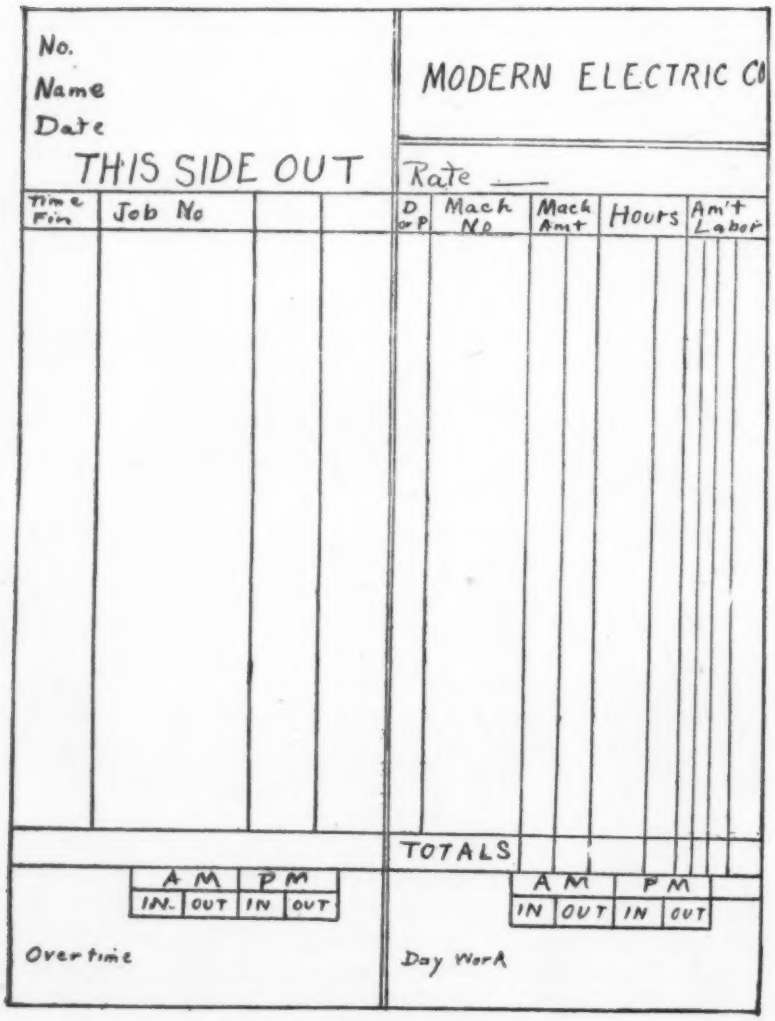
The aim of the cost system herein outlined is to furnish standard costs which are true under normal conditions. That is, when the relation of expense to labor is as illustrated by the standard line OB in Chart C. The formula for finding the standard cost is as follows:

1. LABOR.
2. BURDEN ON LABOR.
3. MATERIAL.
4. BURDEN ON MATERIAL.

5 = SHOP DELIVERY = 1 + 2 + 3 + 4.

6 = DRAFTING EXPENSE.

7 = STANDARD COST = 5 + 6.



FORM 1

Production System and Cost Summary

The relation of the production orders to the cost summaries required is illustrated in Chart F. For each order issued by either the store or the factory a cost summary is required.

Method of Operating the Machine Unit System

Cost Analysis engineers recently installed a complete time keeping and labor distribution system in the factory of The Modern Electric Co., which illustrates the most up-to-date practice. Employees ring up their attendance on International Time Record Clock Cards, Form 1. This form also provides a place for the operator to record the time each job is finished, job no., lot no., operation, and machine number. By numbering the machine rates as follows, and affixing the rate number to the machine number, which is painted on machines, the operator's report gives the whole story.

Machine Hourly Rate	Rate Number
.05	1
.10	2
.15	3
.20	4
.25	5
.30	6
.35	7
.40	8
.45	9
.50	10

Thus machine number 408 on the time ticket is interpreted to mean machine number 40 at the rate of .40 per hour.

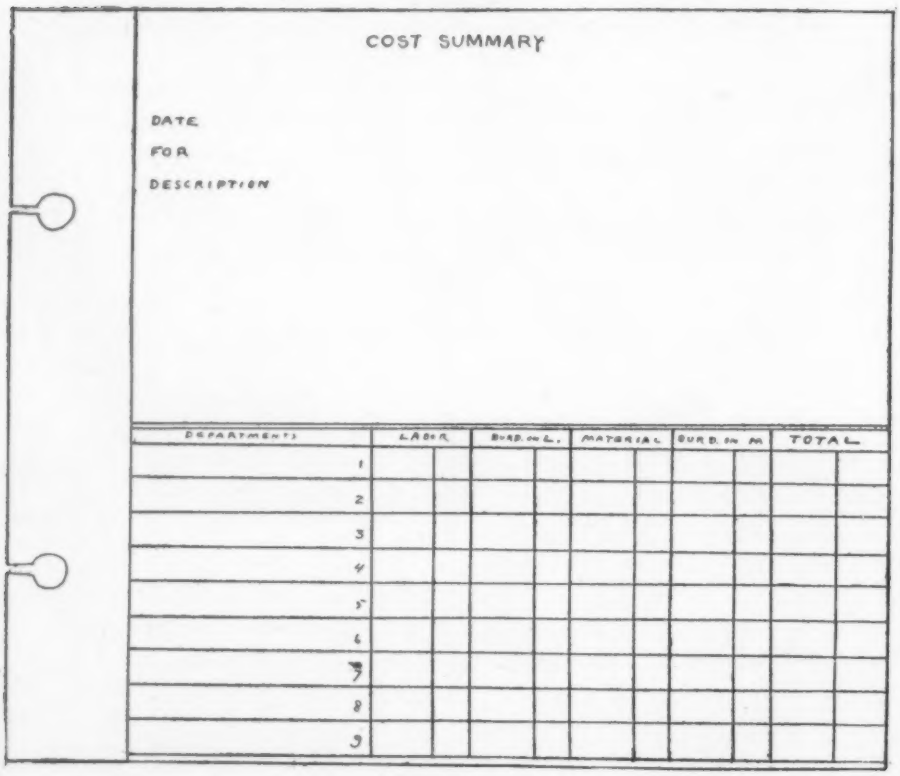
12 11 10	Day	Dept. No.	Man No.	Order No.	Machine No.	Burden	Hours	Labor	MODERN ELECTRIC CO.
	00	00	00	00,000	00,000	0,000	000	000	
1	11	11	11	11,111	11,111	1,111	111	111	
2	22	22	22	22,222	22,222	2,222	222	222	
3	33	33	33	33,333	33,333	3,333	33	333	
4	44	44	44	44,444	44,444	4,444	44	444	
5	5	55	55	55,555	55,555	5,555	5	555	
6	6	66	66	66,666	66,666	6,666	6	666	
7	7	77	77	77,777	77,777	7,777	7	777	
8	8	88	88	88,888	88,888	8,888	8	888	
9	9	99	99	99,999	99,999	9,999	9	999	

FORM 2

In the office the burden and labor are extended.

Machine Punched Cards

The records on the clock cards are transferred to punched cards similar to that used on an automatic piano, one of which is shown in Form 2. An electric sorting machine goes with this system. By setting it to sort a certain classification, say account number 21, it throws out all number 21 cards. After sorting,



COST SUMMARY

DATE

FOR

DESCRIPTION

DEPARTMENT	LABOR		BURD. ON L.		MATERIAL		BURD. ON M.		TOTAL	
1										
2										
3										
4										
5										
6										
7										
8										
9										

FORM 3

these cards can be added on an electric tabulating machine according to classification. It is operated by an electric motor and is controlled in all its mechanism by electricity.

The labor, burden, and material reported against each job number is entered on the Cost Summary. Form 3. Monthly all cost summaries which have been completed are incorporated into the general ledger by a journal entry.

Report of Productive Labor and Burden Distributed

Monthly a report is made of productive labor and of the burden distributed. As previously pointed out the current expense is different from the standard expense except at the normal point where the ratio of expense to labor is the same. The difference between the amount of expense distributed and the actual amount incurred for a period is the current variation. The ratio of this to the amount of burden distributed is called the Current Variation Ratio which must be added, below the normal point, and subtracted above in order to get the current cost. The standard cost formula must now be modified as follows to give the current cost.

8 = Current Cost = Standard Cost ± Cur. Var. Ratio.

Adjustments

In case the current cost is less than the standard cost it is apparent the charge to finished goods account is too low. Moreover the sales would be priced too low. With the inventory too low and the profits overstated, it is obvious that an adjustment is necessary of the balance to the burden account due to the current variation in the relation of expense to labor.

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EDITORIAL

Scientific Business Management

Efficiency in business enterprise happens to be a very live subject at the present time, and the readers of THE JOURNAL are to be congratulated on having a chance to read the four excellent papers on that subject which are contained in this issue. These papers constitute the leading addresses at a recent meeting of the New York Economic Club, and were heard with great interest by an audience of over a thousand men. Grouped together they make a stimulating symposium, for each approaches the topic from a different point of view. The discussion before the club was in no sense a debate, yet the reader will discover that each speaker had in mind some of the points that were made by the others, while Mr. Brandeis, who closed the discussion and whose address as printed in THE JOURNAL is a transcript of stenographic notes, evidently spoke, not as the representative of either employer or employee, but as the advocate of a policy which he believed must result to the advantage of both.

As an academic proposition nobody will be foolish enough to deny that scientific business management, if it increases the output of a given number of men and machines, must in the long

run tend to raise the wages of labor and the rate of return on invested capital. It does not mean that the men must work harder or have longer hours. It means rather the elimination of unnecessary work, and hence a larger output per man. It means that good generalship is as important in industry as it is in war. If machines are permitted to be idle part of the time, or if skilled labor is called upon every day to do the work of unskilled labor, there is evidently something wrong; and it is to prevent such conditions that the advocates of the so-called new conception of industrial efficiency are bending their energies.

It is not strange, however, that the spokesman for workingmen should look with suspicion at this new conception, for there is no doubt that many employers will find in it an excuse or an incentive for adding to labor's burden without a commensurate increase in its reward. Laboring men know very well that employers, as a rule, are much more concerned about profits and the rate of dividends than they are about the fatigue and hardships endured by their workmen. They also know that the average employer, especially if he is the officer of a corporation whose directors will scrutinize only results, will be inclined to interpret scientific business management in terms of cost of production, and that when he seeks to lower costs he will first of all direct his attention to the pay roll.

The reader of these addresses will discover that in the opinion of at least three of the speakers a manager who seeks to increase his profits by a reduction of wages or by the imposition of additional burdens upon his employees belongs to the old and unscientific school of management. Scientific business management does not enter the field with a whip or with a cheese-paring knife. It is really a friend of labor quite as much as of capital. It seeks to make every moment of labor count for the most, to produce the most, and hence to deserve the highest possible reward. In the same way it seeks to prevent any waste on the part of capital and so to increase the profits of industry and business. In short, scientific business management is nothing more or less than an attempt by thoughtful, shrewd, practical men to make concrete application of the long-accepted principles and theories of orthodox political economy, and thus to help bring on the economic millennium in which there shall be no idle or misapplied capital and no wasted or underpaid labor.

The Association's Responsibility

One of the distinguishing marks of any profession is its sense of obligation to the community. The members of a profession enjoy certain benefits by reason of their calling, and while these benefits may be intangible, they are none the less valuable; hence members of a profession must recognize their obligations to the public at large—obligations which are not imposed upon members of a trade. Everyone who has been observant of accountancy development in this country must be impressed with the exceedingly rapid progress being made towards a solidarity of the profession and with the growth of a true professional spirit among the members of the American Association of Public Accountants.

It is exceedingly gratifying to the well-wishers of accountancy to observe the growth of this spirit of unity and the recognition of a need for organized and unselfish efforts towards placing business methods and conditions upon a higher and saner basis. This development is clearly traceable in connection with the movement which started less than two years ago for a more efficient business organization in the national association itself. When the matter was first broached, many members of the Association felt that however desirable it might be to have an executive officer, or permanent secretary possessing a high order of administrative ability, such a plan must prove impracticable. Others were opposed to the movement as being contrary to precedent, and we regret to say that there was some feeling that through such a movement benefits might accrue to some members of the Association in larger measures than would be enjoyed by others. During the earlier stages of the discussion even those in favor of the plan appeared to think that it should be tried out with a younger man who might be expected to develop with the position.

It is, however, obvious that accountancy is approaching a critical period in its development and that such important problems as are involved in corporate regulation, railroad and public service rates and securities, revision of the tariff and monetary system of the country, not to mention other highly important subjects, have a vital bearing upon the development of the profession. What is more important from the public standpoint, the correct solution of these problems can be greatly facilitated by

the coöperation of the accounting profession; and without such coöperation, the business interests of the country will be seriously jeopardized.

The average legislator, for instance, looks upon accounting as an exact science, the operation of which can be safely entrusted to a clerk attached to a government bureau, and while business men of any breadth of training realize that such an attitude is both foolish and dangerous, they logically enough expect the accounting profession to be vigilant and energetic in its efforts to protect business interests in all matters of legislation or other public form in which accounting problems are involved.

That the American Association is now fully alive to its opportunity as well as to its responsibility is evidenced by the action of the board of trustees at its recent meeting, at which, as reported in another column, the recommendations of the executive committee regarding the engagement of a permanent secretary were confirmed and instructions given to the committee to take prompt steps to make all necessary arrangements with a thoroughly efficient man and to report thereon by mail to the trustees. This action is, in our judgment, far-sighted, and in pursuance of such a broad-minded policy the Association will rapidly become an important factor in shaping commercial and financial legislation and determining the business standards of this country.

C. P. A. Syllabi

The Education Department of the State of New York has just issued Bulletin No. 487, Certified Public Accountants' Syllabus. While it is only a little over one-third the size of the first and second editions of the old syllabus, the information that it gives is to the point. The first thing that strikes one's attention is the technical and yet logical definition of the term Accountancy; namely, "Accountancy is a profession, the members of which, by virtue of their general education and professional training, offer to the community their services in all matters having to do with the recording, verification and presentation of facts involving the acquisition, production, conservation and transfer of values." To those accountants who not long ago were called

upon to express their opinion with regard to the meaning of the term, Public Accountancy, such a definition coming from the New York State Board of Accountancy will be both interesting and helpful.

The new syllabus makes no important change with regard to the subjects on which the candidates are to be examined, for the reason that the law still requires the four typical divisions: Theory of Accounts, Practical Accounting, Auditing and Commercial Law. However, under the heading of Theory of Accounts, instead of there being merely single terms, as was the case in the old syllabus, this branch of study is divided into three parts, namely, Elementary Theory, Advanced Theory and Special Theory. The first covers the principles of accounting in so far as they relate to double entry and other methods of recording business transactions, dealing for the first time with the arithmetical processes such as calculation of equated date of payment, the averaging of accounts, the calculation of discount and interest, etc. The second deals with the corporate form of business organization, such as the issuing and treating of capital stock of various classes and preferences, reserves and funds, syndicate operations, the dissolution of corporations, etc. Under Special Theory is included the application of the elementary and advanced principles to special classes of accounting. As an indication of the scope of the division, the following are mentioned: cost accounting, public service accounting, municipal and government accounting, insurance accounting, accounting of executors, etc.

Auditing is also divided into two parts, which we might call principles and practice. Under principles is included all that is essential in the establishment of the accuracy of accounting records, with the exception of the working practice. The practice is subdivided into two divisions; namely, office procedure and reports and statistics. The candidate in this case is expected to be familiar with the principles of presentation, and with the construction of statements and the uses of statistics. Such a division was hardly possible in the earlier syllabi, for the reason that there were no schools offering such courses, a lack which many universities are now trying to overcome.

In the case of Law and Practical Accounting, we are inclined to think that the outline of the former is too exhaustive, while

that of the latter is somewhat limited. The following statement is given in the syllabus with regard to Practical Accounting: "Under this subject of professional study will be considered the application of principles to states of fact given in the form of propositions." This is indefinite. A candidate could hardly tell what would *not* come under that heading. In this respect the outline in the old syllabus was more specific. The outline of this subject in the Pennsylvania C. P. A. syllabus is more exhaustive.

The bibliography given in the bulletin is of importance. The examiners have finally realized that accountants do not live wholly in a sphere of their own, and that they must have some knowledge of related subjects. The reading that the Board recommends in such well-known works as "Funds and Their Uses," "Anatomy of a Railroad Report," "Corporation Finance," and "Trusts, Pools and Corporations," is to be commended.

We regret that the New York Board of Examiners did not follow the suggestion of the Pennsylvania Board and include History of Accountancy under one of the main topics. It is a study of great interest and value to the young aspirant.

We are glad to note that the attitude of several State Boards of C. P. A. examiners has greatly changed within the last few years. While in some instances a policy of secrecy with regard to examination papers is still in force, most of the examiners endeavor to inform the public, especially those interested in the C. P. A. examinations, of the standards set at examinations. Many of the boards are continually at work revising the old syllabi and bringing them up to date. By advising the candidates for examinations as to what they will be expected to know, and by preparing the examination papers on the basis of the syllabus, examiners clear the atmosphere of possible suspicion as to the fairness of the examinations. Statistics of failures certainly do not justify the inference that C. P. A. examinations in the United States are conducted unfairly.

At a quarterly meeting of the Virginia Society of Public Accountants, Incorporated, held in the Chamber of Commerce, in the city of Roanoke, Va., on Saturday, March 11, 1911, the following resolution was adopted:

"On motion, it was *Resolved:* That the next quarterly meeting of the Society be held at Luray (Cave), Va., on Thursday, June 8, 1911. Further, that the Secretary have a notice published in the May number of the JOURNAL OF ACCOUNTANCY and extend an invitation to the members of the American Association of Public Accountants to meet with us."

Board of Trustees Meeting

The Semi-Annual Meeting of the Board of Trustees of the American Association of Public Accountants was held at 165 Broadway, New York City on April 10, 1911.

There were present:—

President .....E. L. Suffern
Treasurer .....H. A. Keller
Secretary .....T. Cullen Roberts

Vice Presidents: F. W. Childs, Connecticut; Ernest Reckitt, Illinois; Chas. H. Tuttle, Massachusetts; John E. Cooper, New Jersey; Henry R. M. Cook, New York; James W. Fernley, Pennsylvania.

Trustees: R. H. Montgomery, E. W. Sells, John A. Cooper, W. Sanders Davies, W. F. Weiss, J. E. Sterrett, J. S. Goodloe.

Letters of regret were received from

Messrs. Geijsbeck, of Colorado; Temple, of Minnesota; H. B. Boudar, of Virginia; E. S. Thomas, of Ohio.

Mr. Weiss as Chairman of the special Committee on Resolution of Thanks to the retiring President read the following:

"*Resolved* that the American Association of Public Accountants through its Board of Trustees hereby express its grateful appreciation of the valuable and efficient service rendered by Mr. Joseph Edmund Sterrett, C.P.A., as President of the Association during the two years October, 1908, to October, 1910.

"Having been elected as a result of a general recognition of his experience and fitness, and of his long and distinguished record of useful effort in the interest of organized accountancy, his urbanity, skill and fairness as a presiding officer and his fidelity and earnestness as an executive were so eminent that he was re-elected without opposition and now retires from the office which he has administered with marked success for two terms, with the esteem and regard of all his associates."

A verbal report was submitted by the President which called attention to the importance of informing the public and especially those in authority over governmental affairs of the existence and constituency of this association, and of directing the attention of the members, especially those who are comparatively young in accountancy, to the opportunities which are presenting themselves for emphasizing the acquirements and qualifications of members of the Association in all forms of accountancy service.

Reports were presented by Vice President Reckitt concerning the activity of the Illinois Association and by Vice President Cook, who referred to the efforts which New York State Society of Certified Public Accountants was now making to obtain some progressive legislation, which it was hoped would be enacted before the adjournment of the present Legislature.

Mr. Cook also brought to the attention of the Board the lack of uni-

formity between the requirements for fellowship in this Association and the requirements for C. P. A. certificates in New York State. His point of view was, that while an accountant who might not be a C. P. A. of any State was eligible to election as a fellow of this Association the same privilege would not exist for a man who had passed his examination in New York State, unless he could show three years practical experience on his own account or in an office of an accountant, according to the constitution of the association. The New York requirement demands that a man should have three years' experience in accountancy, one year of which should be in the office of a public accountant. The matter was referred to the Committee on By-laws—to report at next meeting.

The Treasurer's Report showed a balance on hand at October 1, 1910, of $2,014.69; receipts of $3,867.58, and expenditures of $2,624.59 with a balance on hand of $3,257.68.

The Report of the Executive Committee stated that 1,200 copies of the new Constitution and By-laws had been printed and distributed. It also referred to the correspondence which has been had with various members of the Committee regarding legislation and other affairs. It embodied the following regarding the subject of Accounting Terminology:

"The great importance of a proper terminology has been seriously before the Committee and consideration has been given to the best method of undertaking this work of preparation.

"After much deliberation, it was decided that the work would more rapidly advance if it might be placed in the hands of one individual who might have power to associate his co-workers with himself.

"The Committee is gratified to state that Mr. Herbert G. Stockwell has been induced to undertake this labor and we may all have reason to feel that it will be carried on with skill and reasonable progress."

It referred with regret to the death of three of the original members at large, Mr. Francis Edward Beck of California who was admitted to membership October 2, 1888; Mr. W. E. Plant of St. Louis who was admitted to membership on January 29, 1903; Mr. L. V. Faller of Baltimore who was admitted to membership on February 27, 1902.

The report of the Executive Committee in the matter of the executive officer was considered at length and fully discussed. The Committee stated that it was not yet in a position to present formally the name of any gentleman for this office, but that it had fully considered the names of a number and had reached the conclusion that if the Association is to progress along the lines and in the measure which seems essential, it may be necessary that the amount available for the compensation of such an officer should be increased. The Board sustained this view and the report of the Committee was adopted, and the Committee authorized to proceed to carry out its plans according to its best judgment.

A motion was passed appointing Mr. T. Cullen Roberts as Secretary until his successor be appointed.

The Committee on Federal Legislation reported that a communication had been sent out to all members of the Association early in the year requesting the exercise of their influence upon their respective Senators

and Representatives toward securing an amendment to the existing Corporation Excise Tax bill, so that the date of reports of corporations might be changed from December 31 to the date of the fiscal year of such corporations.

Mr. Montgomery, Chairman of the Committee spoke of his gratification at the result of this communication; while not many had taken the interest to write to their representatives, yet those who had, had received courteous replies, which in several instances expressed surprise that no such effort had been made before.

The Committee also reported that there is an opportunity at present to do much toward securing this amendment, and if the Association had an efficient officer who would be charged with the duty of representing the Association before Congress, or the committee who should consider such an amendment, much might be accomplished.

The Committee on State Legislation reported correspondence with various gentlemen in several states in which they have endeavored to secure legislation, and reported further that a C. P. A. bill had been enacted in the state of West Virginia. The Committee expressed its opinion that unless the best form of legislation can be secured it was desirable that none should be enacted, believing that it is unwise to attempt to secure legislation in states in which there is no well organized body of accountants to be benefited thereby.

At a preceding meeting of the Board of Trustees, the President was requested to fully consider the situation in Minnesota and his report, which contained no recommendation, was adopted.

The following gentlemen were elected as members of the Association:—

Pennsylvania Institute of Certified Public Accountants
Fellows
William G. Klein, C. P. A.
Neal McMenamin, C. P. A.
George W. Borden, C. P. A.
William Jeffers Wilson, C. P. A.

Illinois Society of Certified Public Accountants
Fellows
James Hall, C. P. A.
Walter Beans, C. P. A.
John Mahony, C. P. A.
L. G. Groebe, C. P. A.

Connecticut Society of Certified Public Accountants
Associate
Joseph G. Austin, C. P. A.

Montana State Society of Public Accountants
Associates
Winfield Scott Baldwin
Robert Richard Squire
Robert Ives Wilson

Incorporated Public Accountants of Massachusetts
Fellows
Frederick J. Hillman, C. P. A.
Henry W. Greeley, C. P. A.
Charles Dyer Chase, C. P. A.
T. B. Carnegie Steele, C. P. A.
James D. Glunts, C. P. A.

Washington Society of Certified Public Accountants
Fellows
James P. Robertson, C. P. A.
Robert E. Smith, C. P. A.

Wisconsin Association of Public Accountants
Fellows
Shepard J. Barny
Advanced from Associate to Fellow
Gladstone Cherry

California State Society of Certified Public Accountants
Associates
R. W. Bowes, C. P. A.
E. W. Phipley, C. P. A.

The Resolution was adopted that Secretaries of the several societies be informed that whenever the name of an applicant who is a resident of another state in which an association exists be presented, the consent of such Society be first obtained as a preliminary to the presentation of the name of applicant for membership.

Announcements

Charles C. Carson and J. Gordon Hill, Certified Public Accountants, have announced that they have formed a partnership for the practice of public accounting under the firm name of Carson & Hill, with offices at 717 Walnut Street, Philadelphia.

The Fourth National Bank of the City of New York has announced that Mr. Chas. E. Meek, Secretary-Treasurer of the National Association of Credit Men, has been appointed an assistant cashier of the bank. Mr. Meek will enter upon his new duties immediately after the annual meeting of the Association, June 13–16, 1911.

Reynold E. Blight, Certified Public Accountant, has announced that he has opened an office at 507 Union Trust Building, Los Angeles, Cal., for the practice of public accountancy.

Willis S. Whittlesey and George W. Myer, Jr., Certified Public Accountants, have announced the formation of a partnership for the general practice of accounting, with offices in the Transit Building, 7 East 42d Street, New York.

Correspondence

Sinking Fund Reserves

To the Journal of Accountancy:

I was in hopes that the ruling of the Inter-State Commerce Commission that the provision for a Sinking Fund was part of the Surplus and must be added to the free Surplus to show the total Surplus, had finally disposed of the question. I should not have taken any further part in the discussion, if it had not been for the intimation by Mr. Searle in the February Journal that I "would favor disregarding any such stipulation in a deed of trust." I never, in any way, took any such position, nor do I now.

The whole question hinges on the expression, "out of profits." If that is synonymous with "chargeable to profits," the ground is swept away from under me. There is no question but that the sinking fund must be provided for out of the money which is obtained by profits made and not dissipated in dividends. Are they any the less profits because they are retained in the business? If they are profits, they belong in the Surplus account, just as much as do other profits that are not divided.

Suppose a parallel case. A binding agreement is made by the Common Stock of a company with the preferred stock that the common stockholders will waive any claim to dividends until the profits over and above the preferred dividend amount to $100,000 and that "out of those profits," an additional building will be erected to cost $100,000. Would that amount be charged to Profit and Loss? I confess I cannot understand why an accountant can be guilty of charging anything to Profit and Loss, except losses and expenses, actual or potential. A reserve is set up against an estimated or potential loss. It cannot be set up against an asset, except in so far as there is an element of loss in that asset, for depreciation or otherwise.

I claim, and no one has yet attempted to deny the claim, that the expression, "out of profits," means out of the funds provided by profits; further, that the setting up of a Reserve for Sinking Funds as a liability causes the stockholder to think that the book value of his stock is *pro tanto* diminished; and finally that there is no objection to showing that a certain amount of the profits, as evidenced by the surplus, which is simply accumulated profits, has been dedicated to the redemption of bonds, but that this amount is still part of the Surplus and should be shown as such. The Inter-State Commerce Commission calls it Appropriated Surplus and adds it to the Free Surplus to make the Total Surplus.

Finally, Mr. Searle himself proves my point. He says, "the proper disposition to make of the sinking fund reserve is to declare a stock dividend and close the account into capital stock." To which I say, amen. But I never yet heard of a dividend, whether cash or stock, that was payable out of anything else but Surplus, or profits. If Mr. Searle declares a stock dividend and charges it to his hybrid reserve account, he is either declaring a dividend out of something which is not surplus or profits, or else his reserve account *is* surplus.

Seymour Walton.

Chicago, March 21, 1911.

Book Department

EDITED BY LEE GALLOWAY, PH.D.

SCIENTIFIC MANAGEMENT, by LOUIS D. BRANDEIS. Published by The Engineering Magazine, N. Y. City, 1910. Price, $1.00.

WORK, WAGES, AND PROFITS, by H. L. GANTT. Published by The Engineering Magazine, N. Y. City, 1910. Price, $2.00.

PRODUCTION FACTORS IN COST ACCOUNTING AND WORKS MANAGEMENT, by A. HAMILTON CHURCH. Published by The Engineering Magazine, N. Y. City, 1910. Price, $2.00.

The question of economic waste in production has been forced on our attention by the steady and rapid increase in prices and the consequent apparently growing costs of production. Financial panics and industrial depressions are not pleasant occurrences; they are as costly as great wars, but like wars they compel a nation to stop and take stock of its resources, its method of handling them, and the recent panic of 1907 has forced the question of economic waste upon our consideration. Every period of industrial depression whether due to abnormally high or low prices has brought some important business principle to the surface and the discussion of these principles has stamped certain ideas upon the nation so generally that each generation of business men may be said to have had its peculiar economic philosophy. A topical economic history might easily be written by using such well-known titles as the following which in their time served as terms for the general business philosophy of the day:—favorable trade balances, the industrial revolution, the growth of the joint stock and limited liability, unsecured paper money, land speculation, railway and canal speculation, overproduction, under-consumption, bimetallism, etc.

The shibboleth of our present business philosophy is "scientific management." The advantages to be derived from the adoption of scientific management have been compared with those which accrued to industry through the use of steam power and the mechanical inventions. If the bearing of the latter upon our economic progress during the last century is taken into consideration, then it must be realized what an enormous task is imposed upon the principle of scientific management if it is not to suffer by contrast. Yet it is by no less a standard that the exponents of this new science desire the final influence of their work to be measured. It is probably not too much to say that the principle of the division of labor as advocated by Adam Smith will have a new application and that its results will be as momentous in the saving of time and energy in the increased production of goods as did the first application of that method which separated the work of the laboring man into various employments but left the work of management remaining as a unit. The managerial function was dependent upon the capacity of some one man to control the many employments, whereas the application of steam power to production had resulted in a minute

division of labor so far as the laborer was concerned. The work of directing the processes and overseeing the laborers still followed the methods of the handicraft era of production. One master in the factory was supposed to direct the efforts of many and varied lines of production. But the labor and mechanical problems have become so enormously complex and complicated that the gains in productive capacity due to the technical division of labor are largely lost because there is not an equal progress being made in the direction of specialized management and organization. The refinements of specialization are not supplemented by an equally refined correlation of processes or activities.

Neither the laborer nor the inventor could remedy this defect. It was a question of business organization. It lay outside the province of their experience. The situation demanded a new kind of specialist. The first kind to be developed was the "systematizer." He did good work but his activities were generally confined to a very narrow field. His knowledge consisted of information concerning office appliances, loose leaf arrangements, filing systems and time clocks. His day was brief, for business men soon learned that mechanical systems cannot overcome defects of organization nor the improper and inefficient management of men, methods and processes.

Perhaps if man's inventive power had been confined to mechanical devices alone, the old order of things which depended upon a standard machine and a specialized attendant might have continued much longer, but the genius of Frederick Taylor brought a new element into the field of production. He invented a standard tool steel. With a standard tool another variable and indeterminate quantity was removed from the production process. Therefore it was only a step to complete the cycle of production and create a standardized operation and finally a standard product, that is, having the raw product, the machine, the laborer and the tool all standardized, it was comparatively easy to obtain a standardized operation and finally a standard product.

Mr. Taylor now devoted his attention to the problem of turning out a product whose qualities and cost could be calculated in advance according to certain definite and predetermined standards.

But the step from the old to the new order of things could not be taken until there was a completely new alignment of managerial functions. The old method depended for its direction upon the autocratic boss who based his knowledge upon personal observation and upon facts better for a history than for the guidance of a business policy. The new method must work according to carefully estimated costs; i. e., standards, and the supervision must be vested in a body of experts, each proficient in his particular line. This new division of labor, therefore, consisted in breaking up the duties of management into several distinct functions and placing an expert in charge of each. With this accomplished, the logic of the situation demanded that the administrative control of the shop be exercised along democratic rather than monarchical lines. This means the substitution of a representative system of government in the factory for the old absolute and arbitrary methods of control.

The committee system as developed by Mr. C. U. Carpenter is the most advanced example of this method of factory control. With the tendencies toward the direction of production by specialists and the adoption of democratic methods of control, conditions are ready for the application of the principles of scientific management—an ideal which seeks to ascertain and apply in every process the best attainable methods, practices, tools and machines. It assumes that there is but one best way and when found, all the operations, etc., which produced it must be standardized. Where the principles of scientific management have been applied, greatly increased efficiency of man, machines and tools has been attained.

The fact that the recent investigation of the Interstate Commerce Commission has directed attention to its application in the operation of railroads is only an incident in the development of a process that will gain rapidly in other industries. However, the best collection of pertinent facts that are beyond the experience of any one man is that presented by Mr. Brandeis in his book on Scientific Management. The material is selected from the evidence obtained by the Interstate Commerce Commission at their investigation of the railroads' contention that it was necessary to raise their rates. This evidence is made up of the practical experience of men who have been pioneers in the gaining of greater efficiency through the application of scientific methods to industrial undertakings. Not a page is superfluous. Every sentence is charged with information of tremendous importance to the manager, the laborer and the consumer. A fair example as presented in Mr. Brandeis's examination of expert witnesses is found on page 36.

MR. BRANDEIS: "Taking a man at an individual machine how much does he do under the new system as compared with what he did under the old system?"

MR. HATHAWAY: "In general, it ranges anywhere from three to five times the work formerly done."

MR. BRANDEIS: "Is that attributable in large part to his working harder?"

MR. HATHAWAY: "He does not work any harder than he formerly did. He works more efficiently, however."

MR. BRANDEIS: "And he works more efficiently, why?"

MR. HATHAWAY: "Formerly, when we started a job, he had first to frequently hunt up the foreman to find out what he would do next; then he might have to hunt up his materials and get them to the machine. After that he had to decide how the job was to be done and look up his own tools for it. He had to grind his own tools and all of the things that we now do in the planning department for him he had to do for himself to a very large extent while his machine was standing idle. As it is now, the machine runs along on other work while we are making preparations for his job ahead. That is one reason. Another reason is that our machines are in better shape, we furnish the men with better tools and implements that are put into condition for us and kept in condition for him. Then we show him how to use it."

This is the essence of Scientific management. A dollar a day laborer is given the advantage of the advice of a fifty dollar a day expert.

Along with Mr. Brandeis's book should go Mr. Gantt's book on "Work, Wages and Profits." Mr. Brandeis is an advocate by adoption of the New Gospel of efficiency. Mr. Gantt is an advocate by inheritance. For twenty years he has been closely interested in advanced work in the field of labor management. Mr. Gantt is already well known through his advocacy of what is known as "Gantt Bonus System." His new book shows what methods he has followed in his scientific investigations and in attaining standardization, careful instruction and interconnected reward to both instructor or supervisor and workman. Mr. Gantt's work shows him to have a firm grasp of the scientific method. His association of effects with their causes is philosophic and not superficial. His method is well illustrated in Chapter VII on the Training of Workmen in Habits of Industry and Coöperation. Starting with the hypothesis that habits of industry are more valuable than knowledge or skill, he shows how the quality as well as quantity improves with the habit of industry. The methods of fixing these habits are described with practical examples as to the setting of the tasks and the standardization of the work. To the novice in this work Mr. Gantt's presentation of the obstacles to be met in the introduction of a bonus system into a plant will be of special interest. He also gives instructions on how to introduce the system in a new plant.

The whole book is replete with practical suggestions and represents the author's most mature thought on the subject of scientific management of labor. It is difficult to get business men immersed in the practical affairs of a busy life to write books, but when they do and write out of their own ripe experience as Mr. Gantt has done they put the world under a heavy obligation to them.

It is only when Mr. Gantt and other expounders of the science of industrial efficiency attempt to give their doctrine a philosophic setting in the broader field of economics that their reasoning is not conclusive. This is shown in the final chapter on "Prices and Profits, A New Light on the Cost of Living." "With the Increase in Prices," says Mr. Gantt, "comes increased cost of living—the combination of the high cost of living and the inefficiency of production is rapidly producing a condition of which no one can foretell the result. The one cure, the only one—is to increase the efficiency of the producer."

The mistake made here is in choosing the wrong line of approach to this economic setting. He has attempted to associate scientific management with production by means of price.

It is evident from the argument that the cause of high prices is high cost of production due to inefficiency and that the cause of high cost of living is due to high prices. Mr. Gantt sees the casual relations as they exist in the closed economic cycle of an individual's business operations, i. e., with increase of prices comes higher cost of living; with higher cost of living comes demand for higher wages; with higher wages comes higher cost of production. Then to maintain the same profit comes another increase of selling price and so the cycle completes itself.

Greater efficiency in production may or may not be associated with a contemporaneous lowering of prices in general. A good example of cheapened costs not accompanied by lower prices is seen in the decade from 1896 to 1907. The progress of invention has been as active since 1896 as it was immediately before that date, but lower costs have not been attended by lower prices. The explanation of this seeming paradox is that price levels are dependent upon influences connected with the supply and demand for money and not upon costs of production. After 1896 the supply of gold influenced the direction of the price level more than the increased trade; i. e., the quantities of goods bought and sold which was stimulated by an increase in the supply of commodities.

This tendency toward higher price levels is likely to be seen for some time in the future. It is therefore not a good policy to offer the reward of lower prices as an inducement for the adoption of scientific management. The steady increase in the money supply may easily outweigh any tendencies which scientific management may have upon more efficient production, increased trade and therefore lower price levels dependent upon the last. The real benefits which would come to society through the saving of the great waste due to inefficient management may be lost sight of in an attempt to show that these gains may be reckoned in terms of prices.

As Mr. Gantt's book emphasizes the necessity of instruction and expert guidance in gaining more efficient work from both workmen and machines, so Mr. Hamilton Church lays stress upon the necessity for obtaining a thorough knowledge of the primary cost producing elements which enter into a manufacturer's business. First, he separates the capitalistic function from the productive function of the owner. Second, he divides the capitalistic or, as he calls it, the "property holding" function into those of land owner, landlord of buildings, supplier of power and similar functions. Third, the manufacturing function is divided into general and localized functions. Among the general factors which belong to the manufacturer as a whole are those pertaining to the organizing function. Those factors which can be definitely allocated to some individual machine, floor space; i. e., some "production center" are insurance, interest, depreciation on capital, average cost of maintaining and repairing, etc.

Like all classifications not based upon a rigid analysis the economic functions of an individual enterpriser, Mr. Church's division serves better as a working basis for obtaining a grouping of data for practical purposes than it serves as an example of scientific classification. Only one inconsistency need be pointed out in order to substantiate this.

Mr. Church would separate the property owning function when associated with land or buildings from the manufacturing function, but under the latter he includes the ownership of the machines, tools, etc. Such a classification usually serves a very practical purpose, but it is not based on a real distinction as to function. The manufacturer as a producer in the economic sense is no more dependent upon his function as a property holder of machines than he is upon the holding of land or buildings. All are "separable" (i. e., other men may own and rent these factors to the

manufacturer) from the main productive function of the manufacturer. The difference is simply one of degree and not of kind.

The purpose of this classification is to determine clearly the source of each element of cost so that any fluctuation in expense can be immediately traced and definitely located. Again by resolving the productive processes into their component factors there is offered a basis for the determination of standards. It is this feature of the productive factors that brings their consideration into line with the principles of organization and scientific management.

Without doubt Mr. Church has laid down the correct principles for the obtaining of cost data—i. e., the elimination of as many of the indeterminate elements as possible—the reduction of the "overhead" to its lowest terms. Furthermore in his attempt to express the cost of the various "services" in *terms of the time of the operation of the tool* he has given a method which comes nearer to presenting a complete understanding as well as a means of control of the process of manufacture, than any heretofore given. It may be said in brief that his whole organization system depends upon tracing all the various productive factors until they converge "at the point of the tool;" while his cost system depends upon the allocation of the "burden" which accompanies the productive factors. No matter how much the cost accountant may disagree with the author as to the practicability of determining actual costs in such minute detail, nevertheless, he must acknowledge the author's criticism of the "Averaging" method as unscientific and as affording a cheap way out of a practical difficulty to be just. The chapters on apportioning indirect expense, control accounts, costs and the Financial Books should be read by every accountant.

INDUSTRIAL PLANTS, THEIR ARRANGEMENT AND CONSTRUCTION, by CHARLES DAY. Published by The Engineering Magazine, N. Y. City, 1911. Price, $2.00.

The majority of industrial engineers have devoted their energies to the solving of the problem of wastes due to inefficient factory operation. Mr. Day has adopted as his specialty the study of losses due to poor plant location and construction.

The engineer who can point to a wobbly tool needs to use little argument to convince the manager that he is suffering losses. The engineer who discovers losses due to poor location in respect to power supply or improper sanitary conditions has a different proposition to demonstrate. Cause and effect are not so closely associated or at least not so objectively demonstrable. The subtle wastes due to lost power either in the engine or the laborer are more difficult to trace, but are just as important in determining the margin of profits. The business world is to be congratulated that a man of Mr. Day's proved ability has projected the methods of scientific management into the field of industrial construction, a province hitherto little studied. His book is a record of the methods employed in the construction and reconstruction of some of the most successful factories in the United States. The author has applied

the principles he advocates in the construction of his book. The chapters in the first part deal with the building of a manufacturing plant. Every step is given its proper place and proportion. Although much detail is necessarily employed, the reader is aided by the use of novel and interesting diagrams which guide him easily through technicalities and methods which appear involved when dependent upon words alone for their description.

The book, we believe, is the first permanent record of the principles and practice of scientific works in design and construction. The following chapter headings indicate the general character of its contents: General Classification of the Work; Determination of Specific Requirements; Selection of the Site and Definition of Building and Equipment Features; Detailed Plans and Specifications; Construction Work and Installation of Equipment; Period of Occupation and Commencement of Operation; Routing, A Prime Factor in Layout; Metal Working Plants; Machine Shops and Their Specific Requirements; Modern Industrial Plants; Value of an Engineering Organization and Construction Service.

In closing this notice of Mr. Day's valuable book we might add that it is just as suitable for the accountant's library as it is for the engineer's. Perhaps it is more important that accountants read this book.

MODERN MACHINE SHOP, CONSTRUCTION, EQUIPMENT AND MANAGEMENT, by Oscar F. Perrigo, M.E. Published by The Norman W. Henley Publishing Co., 132 Nassau St., N. Y. City, 1906. Price, $5.00.

A business man in choosing his books upon scientific management would do well not to overlook Mr. Perrigo's work on Construction, Equipment and Management as applied to the Modern Machine Shop. It complements in an admirable manner the works already named above. Part One shows the principles of construction as applied to machine shops of a manufacturing plant. What Mr. Day has done for the general subject of construction, Mr. Perrigo has done for the specialized field of The Shop. With this in view the author has discussed in a clear and forcible manner the practical problems connected with the best design, arrangement and construction of a plant for the manufacture of a medium sized class of machinery. With this object in view the author has included many engravings showing the general plan for suitable buildings of a size, form and capacity for the usual work, arranged in a compact form of modern construction and supplied with all necessary conveniences for readily and economically handling the material and product. The book as a whole contains 208 engravings, designs and drawings especially prepared by the author.

Part Two, which treats of Machine Shop Equipment, is not as its title implies a dry and technical enumeration of appliances. Its scope is broader. Each important piece of equipment is not only completely described but its setting as a necessary part of a business organization is given. It is this that supports the reader's interest, since the machine's

usefulness is judged by its effect upon the firm's commercial efficiency. It is not only the machine or tool as such that he describes, but it is the equipment as a profit producing factor in the business.

Part Three, Machine Shop Management, arouses the reader's curiosity to know in what manner its treatment will square with those modern ideas advanced by Mr. Brandeis, Mr. Going, Mr. Gantt, Mr. Church and Mr. Day. The reader is not left long in doubt, for the first paragraph shows the author to be abreast of all modern ideas which may help the machine shop achieve its highest efficiency. "There is no truer illustration of the statement," says Mr. Perrigo, "that 'old things have passed away and all things have become new,' than is shown by the modern methods of the management of the manufacturing enterprises of the present day. The days of the one-man engagement have passed away and in their stead have come the management by a system of divided and properly distributed responsibility, whereby the real head of the establishment takes up only the consideration of the larger, broader, and more comprehensive questions of importance in management, leaving to his able assistants the questions of the next grade of importance, and in their special spheres, while they, in turn, divide the next grade of lesser responsibilities with *their* assistants, the foremen, and so on down through the several grades of less importance to the operators or workmen."

It is not surprising, then, to discover further that the problem of apportioning the fixed charges is solved somewhat after the methods of "production centres" and a "supplementary rate" advocated also by Mr. Church, although the author here does not attempt to discharge so many different and independent "incidences" of expense into the one element of "Machine Rate" as is done by Mr. Church. Mr. Perrigo keeps to the older classification of fixed charges. This chapter on costs and the following one on the tool and stock room will prove to be exceedingly suggestive to the accountant since not only the general principles of arrangement are treated of but many forms are printed showing how the records are made and kept in accordance with the author's system of development.

THE JOURNAL is glad to note the recent appointment of Mr. William Plender, of the firm of Deloitte, Plender, Griffiths & Co., London, England, President of the Society of Chartered Accountants of England, to a very important committee recently appointed to ascertain and consider, among other things, the existing financial relations between Ireland and the other component parts of the United Kingdom. Among the other members of the committee are Sir Henry Primrose, ex-Chairman of the Inland Revenue; Chairman of the Committee, The Most Rev. Denis Kelly, Bishop of Ross, and Lord Pirrie.

This recognition of the Accounting Profession in England will be of interest to accountants everywhere.

Legal Department

EDITED BY CHARLES W. GERSTENBERG, PH.B., LL.B.

The Legal Department of THE JOURNAL OF ACCOUNTANCY is prepared to render a genuine service to its subscribers and readers, by undertaking to answer legal questions submitted to it. These questions, while they may be suggested by the problems that arise in the practice of our correspondents or by the more theoretical requirements of examination boards, should always be stated as to call for single propositions of law. Whenever the Department receives a query the correct answer to which may vary with many possible but unstated circumstances the correspondents will be asked to give the details or advised to consult local counsel. Reasonably prompt replies by the Department will be made by personal communication or through the columns of THE JOURNAL. Address all communications to THE JOURNAL OF ACCOUNTANCY, Legal Department, 32 Waverly Place, New York City.

APPORTIONMENT OF EXPENSES OF LITIGATION BETWEEN INCOME AND CORPUS OF ESTATE

COURT OF APPEALS
Decided April 4, 1911

New York Law Journal, April 22, 1911.

In the matter of the application of Martin L. Ungrich, etc., Martin L. Ungrich, respondent, v. Henry Ungrich, Jr., and Martin Ungrich, individually and as executors of and trustees under the last will and testament of Henry Ungrich, deceased, appellants.

Cullen, Ch. J.—The plaintiff, who is the equitable life tenant under a trust created by the will of his father, brought an action against the appellants to have them removed as trustees for alleged misconduct as such and for an accounting. The action, after a long litigation, was decided in favor of the defendants therein and the complaint was dismissed. From that judgment the plaintiff appealed to the Appellate Division, which appeal is still pending. After the judgment in the action the plaintiff presented a petition to the Supreme Court with the double title which prefaces this opinion, reciting the history of the action, alleging that a specified amount of income had accrued from the trust estate since the last payment to him, and praying for an order that the appellants be required to pay over such sums. In opposition to the application the appellants submitted an affidavit, in which it was alleged that in the action mentioned they had recovered a judgment against the plaintiff for costs and issued an execution thereon, under which the sheriff had levied on the plantiff's income in their hands, and they claimed the right, by virtue of such levy and also as a set off, to deduct such amount from the petitioner's claim. They also stated that they had expended in the defense of the action a sum largely in excess of the plaintiff's income, out of which they claimed the right to be indemnified for such expenditures. On the petition and opposing affidavit the court directed the appellants to pay over the accrued income, the amount of which was settled by agreement. The Appellate Division has affirmed that order, and an appeal has now been taken to this court.

The respondent moves to dismiss the appeal on the ground that the order from which the appeal is taken is an order in the action and, therefore, no appeal lies therefrom as a matter of right to this court. We are of opinion the order is not an order in the action. Indeed, if it were such, the order would be void because the action had been terminated by the judgment entered therein. After judgment the court has no power to make an order affecting the substantial right of a party except for the purpose of carrying the judgment into effect, or in those cases where special authority is given by the Code (Kamp v. Kamp, 59 N. Y., 212; Fellows v. Heermans, 13 Abb., N. S., 1; Gardner v. Gardner, 87 N. Y., 14), though this rule does not prevent the court from entertaining a motion to

set aside or correct a judgment. Nor did the fact that the judgment was on appeal enhance the power of the court. Till the judgment should be reversed it was a finality like other judgments. But while the respondent was in error in his belief that this was a proceeding in the action and in entitling it as such, still his mistake in nomenclature should not affect his rights. He proceeded by petition, and in cases of trust it appears to be within the discretion of the court whether to entertain an application for relief by petition or to require an action to be brought for the purpose (Matter of Foster, 15 Hun., 387). Therefore, in reality, this is a special proceeding by petition and the order appealed from is a final order therein.

The position of the appellants that they may either seize on execution the income due the respondent or set off their judgment for costs against such income is based on the claim that the trust to pay over the income quarterly to the beneficiary does not fall within the provisions of section 15 of the Personal Property Law relating to trusts to apply the income "to the use of any person," and was therefore alienable, can be summarily disposed of. Over fifty years ago it was held by this court that a trust to pay over income to a beneficiary was a trust to apply the income to the use of such person within the meaning of the statute (Leggett v. Perkins, 2 N. Y., 297); and as late as the case of Cochrane v. Schell (140 N. Y., 516) it was held that a trust to pay over a specific sum yearly fell within the statute and was not assignable by the beneficiary.

The only way such income could be reached by the appellants as judgment creditors was by an action in equity to impound the surplus beyond the requirements of the beneficiary for his support or by a special execution under section 1391 of the Code. But though the judgment for costs was not available to the appellants as a set-off to the respondent's claim, they were or may have been entitled to indemnity out of the trust estate for expenditures made in the defense of the trust (Perry on Trusts, sections 910 to 913). If these expenses were rendered necessary by the unwarranted action of the life tenant, they should not all be charged against the corpus of the estate, but should, in part or whole, be charged against the life tenant, whose act had occasioned the expenses. Though the beneficiary of a trust, such as the one before us, may not alienate or assign it, still he may subject it to a claim for legal services to enforce his rights (Matter of Williams, 187 N. Y., 286); so, also, his wrongful conduct may result in affecting that income. Therefore, the application should not have been decided by the court without giving the appellants an opportunity to prove their expenses and the circumstances under which they were incurred, when it would be for the court to determine on the facts of the case what part, if any, of such expenditures should be allowed to the appellants and charged against the life tenant and what part against the corpus of the estate.

The orders appealed from should be reversed, with costs to abide the final award of costs, and the application remitted to the Special Term for further hearing.

Vann, Werner, Willard Bartlett, Hiscock and Chase, J. J., concur; Haight, J., absent.

Orders reversed, etc.

In the recent C. P. A. examinations, conducted by the New Jersey State Board of Public Accountants, the following men passed successfully and were granted certificates as Certified Public Accountants in the State of New Jersey:

Mr. Hamilton M. Ross, 36 Irving Place, Passaic, N. J.
Mr. Ira C. Nichols, 638 East 25th Street, Paterson, N. J.
Mr. W. R. Basset, 9 Midland Avenue, East Orange, N. J.
Mr. John Hall Bowman, 32 Union Avenue, Clifton, N. J.

C. P. A. Question Department

CONDUCTED BY LEO GREENDLINGER, M.C.S., C.P.A.

Criticism and exchange of ideas will clear many a doubt and at the same time improve shortcomings. To solve, compare and criticise C. P. A. examinations, is the object of this department. With the aid of suggestions and criticism from the professional brethren, it can undoubtedly be achieved. Inquiries will be cheerfully answered.

Following are the two solutions to problems three and four, given by the New York C. P. A. Board of Accountancy at the recent C. P. A. examination. (The problems appeared in the March, 1911, number of the JOURNAL.)

SOLUTION TO PROBLEM NO. 3 (Part 1)

Prime Cost is here to be understood to mean,

1. Raw Materials.
2. Productive Labor.
3. Manufacturing Expenses.

It is necessary to a clear understanding of this problem to ascertain the average amount of Raw Materials, Productive Labor, and Manufacturing Expenses used up in the goods actually sold from the last time inventory was taken, for this purpose therefore the figures for the three previous years are given amongst others.

Using these we find the following:

RAW MATERIALS ACCOUNT

Inventory, Jan. 2, 1906	$39,223.16	
Purchases during 1906	186,320.16	
	$225,543.32	
Inventory, Jan. 2, 1907		$31,316.20
Purchases during 1907		104,360.22
		$135,676.42
Deduct:		
Inventory, Dec. 31, 1906	31,316.20	
Inventory, Dec. 31, 1907		33,416.20
	$194,227.12	$102,260.22
Inventory, Jan. 2, 1908	$33,416.20	
Purchases during 1908	157,316.20	
	$190,732.40	
Total:		
Raw material used 1906		$194,227.12
Raw material used 1907		102,260.22
Raw material used 1908		158,265.22
		$454,752.56
Deduct:		
Inventory, Dec. 31, 1908	32,467.18	
	$158,265.22	

PRODUCTIVE LABOR ACCOUNT

1906—Amount paid therefor	$90,322.24	
1907—Amount paid therefor	61,212.06	
1908—Amount paid therefor	72,106.14	$223,640.44

MANUFACTURING EXPENSES

1906—Amount paid therefor	$20,163.12	
1907—Amount paid therefor	16,208.17	
1908—Amount paid therefor	20,216.23	$56,587.52

SALES ACCOUNT

		DEDUCTIONS		
	Gross Sales	Allowances	Returns	Net Sales
1906	$386,924.12	$1,116.24	$8,614.08	$377,193.80
1907	217,306.01	3,605.75	4,106.18	209,594.08
1908	321,672.18	975.00	3,167.22	317,529.96
	$925,902.31	$5,696.99	$15,887.48	
		15,887.48		
	21,584.47			
	$904,317.84			$904,317.84

Average Per Cent of Raw Materials used in goods actually sold $454,752.56

$904,317.84 = 50.28%

Average Per Cent of Productive Labor in goods actually sold $223,640.44

$904,317.84 = 24.73%

Average Per Cent of Manufacturing Expenses in goods actually sold $56,587.52

$904,317.84 = 6.25%

Component Elements of Costs in Prime Costs:

	Per Cent to Selling Price	Per Cent to Prime Cost
Raw Materials	50.28%	61.88%
Productive Labor	24.73%	30.43%
Manufacturing Expenses	6.25%	7.69%

The same percentages will prevail in goods in process and made-up goods.

Arriving now at the period where the fire loss occurs, we note that the last inventory taken was on January 2, 1909.

ANALYSIS OF INVENTORIES, JANUARY 2, 1909

	Raw Materials	Component Elements of Goods in Process	Component Elements of Made-up Goods	Total
Raw Materials.....	$32,467.18	$2,606.52	$12,223.45	$47,297.15
Productive Labor.....		1,281.78	6,010.98	7,292.76
Manufacturing Expenses.		323.92	1,519.04	1,842.96
	$32,467.18	$4,212.22	$19,753.47	$56,432.87

CONSTRUCTION OF GOODS ON HAND, MAY 1/09, WHEN FIRE OCCURS

	Raw Materials	Productive Labor	Manfg. Expenses
Inventory, Jan. 2/09..	$47,297.15	$7,292.76	$1,842.96
Purchases to May/09..	46,375.22 pd. out	21,618.06 pd. out	5,167.20
	$93,672.37	$28,910.82	$7,010.16
Deduct:			
Used-up goods actually sold.....	46,879.66	23,057.56	5,827.32
On hand, May 1/09...	$46,792.71	$5,853.26	$1,182.84

SYNTHESIS OR RECONSTRUCTION OF GOODS IN PROCESS AND MANUFACTURED GOODS ON HAND, MAY 1/09

The total of Productive Labor and Manufacturing Expenses amount to.....	$7,036.10	38.12%
The total of Raw Materials amount to.....	11,421.67	61.88%
	$18,457.77	100.00%

Deducting these $11,421.67 of Raw Materials contained in partly made or totally made-up goods from the total Raw Material proper, or $46,792.71, we find the total inventory on May 1/09 as follows:

Raw Material Proper	$35,371.04
Goods in Process and Made-up Goods.....	18,457.77
	$53,828.81

The loss adjusted being 42½%, we find the same to be..... $22,877.24

The plant not having been reduced by any depreciation for the last three years, nor any reserve set up against it for this purpose, as accountants for the assurers we allow a yearly depreciation of 10% on the diminishing value viz.:

PLANT AND MACHINERY ACCOUNT

Inventory, Jan. 1/06	$17,223.96	
Purchases, 1906	500.00	
	$17,723.96	
10% Depreciation	1,772.40	
Value, Dec. 31/06	$15,951.56	
Purchases, 1907	540.22	
	$16,491.78	
10% Depreciation	1,649.18	
Value, Dec. 31/07	$14,842.60	
Purchases, 1908	409.00	
	$15,251.60	
10% Depreciation	1,525.16	
Value, Dec. 31/08	$13,726.44	
Purchases, 1909, to May 1st	361.22	
	$14,087.66	
Depreciation 10% per annum, or 3⅓% for four months	469.55	
Value of Plant May 1/09	$13,618.11	
Loss 42½% adjusted		$5,787.70

SOLUTION TO PROBLEM NO. 4 (PART II)

UNITED MANUFACTURING COMPANY

OPENING JOURNAL ENTRIES—MAY 31, 1909

SUBSCRIBERS		$200,000.00	
To CAPITAL STOCK			$200,000.00
Subscriptions to the Capital Stock of the United Manufacturing Company, incorporated under the laws of the State of New York, authorized capital, 2,000 shares of $100 each, as follows:			
C	$25,000.00		
D	25,000.00		
E	25,000.00		
F	25,000.00		
G	25,000.00		
H	25,000.00		
I	25,000.00		
J	25,000.00		
CASH		$200,000.00	
To SUBSCRIBERS			$200,000.00
MATERIALS AND SUPPLIES		$50,000.00	
To CASH			$50,000.00
Purchased from:			
A Company	$25,000.00		
B Company	25,000.00		

UNITED MANUFACTURING COMPANY

BALANCE SHEET AS AT MAY 31, 1910

ASSETS		LIABILITIES	
Cash	$200,000.00	Wages Accrued	$ 15,000.00
Materials and Supplies, as per inventory	25,000.00	Accounts Payable	160,000.00
Accounts Receivable	200,000.00	Dividend Payable	20,000.00
Plant Addition	60,000.00		$195,000.00
		CAPITAL AND SURPLUS	
		Capital Stock	$200,000.00
		Surplus	90,000.00 290,000.00
	$485,000.00		$485,000.00

UNITED MANUFACTURING COMPANY

CONSOLIDATED TRADING AND PROFIT AND LOSS ACCOUNT—FOR THE YEAR ENDING MAY 31, 1910

Purchases	$160,000.00	$140,000.00	$300,000.00
Labor	305,000.00	260,000.00	565,000.00
Factory Expense	100,000.00	75,000.00	175,000.00
Rent of Plant	90,000.00	60,000.00	150,000.00
Repair and Maintenance	80,000.00	70,000.00	150,000.00
	$735,000.00	$605,000.00	$1,340,000.00
Less—Inventory May 31, 1910	10,000.00	15,000.00	25,000.00
Cost of Production	$725,000.00	$590,000.00	$1,315,000.00
Sales	907,000.00	778,000.00	1,685,000.00
Gross Profit	$182,000.00	$188,000.00	$370,000.00
General Expense:			
Office Expense	$60,000.00	$50,000.00	$110,000.00
Officers' Salaries	90,000.00	60,000.00	150,000.00
Total	$150,000.00	$110,000.00	$260,000.00
Net Profit for year ending May 31, 1910	$32,000.00	$78,000.00	$110,000.00
Dividend Declared—10%			$20,000.00
Undivided Profits			$90,000.00

PERCENTAGE OF CONSUMPTION AGAINST TOTAL COST		
Raw Materials and Supplies	20.69%	21.19%
Labor	42.07%	44.06%
Factory	13.80%	12.72%
Repair and Maintenance	11.12%	11.86%
Rent of Plant	12.42%	10.17%
	100.00%	100.00%

COMMENTS

In a previous number of the JOURNAL we have already commented on the general make-up of the problems. The wording in the case of the third problem in Part I is not quite clear. It is stated that ". . . the insured claims his loss is 42½% of the Prime Cost of his goods . . . the percentage claim is adjusted at that figure." It would be a rather difficult task to determine the total Prime Cost in this case and, if determined, it would not be equal to the percentage given (42½%). The only possible interpretation of the meaning of Prime Cost in this case, is that it embraces in addition to the usual elements of Prime Cost—Raw Materials and Productive Labor—also Manufacturing Expenses. It is on that basis only that the problem can be solved, and that is the method adopted in the solution.

Contrary to ordinary procedure, in order to determine the cost of the three elements, mentioned above, used up in the goods actually sold, the figures for the three previous years must be taken into consideration.

Another element which the problem does not mention is that of depreciation. As no provision has been made for that item, we take the arbitrary percentage of 10% on the declining balance, and by means of this determine the amount of the adjusted loss.

In solving Problem IV (Part II), the interpretation is based on the wording of the problem. As there are only eight subscribers to the Capital Stock of the Company, a controlling account under the heading, "Subscribers," is debited for the full amount of the subscribed stock, and the Capital Stock account is credited. It will be noticed that the initial memorandum dealing with the legal existence of the Company, etc., is embodied in the explanatory matter to the opening entry in the Journal of the United Manufacturing Company.

No other entries are given affecting the United Manufacturing Company that cannot be properly called opening entries. Thus it will be seen that while Accrued wages and Dividend payable appeared on the liability side of the Balance Sheet of the United Manufacturing Company, no entry was made to provide for that.

The Consolidated statement is so arranged as to prove and agree with the results shown in the Balance sheet.

The percentage table is prepared after adjusting all possible inventories, etc. In other words, as the heading indicates, consumption is the basis.

Three men were successful in passing the examinations of the State Board of Public Accountants in Maryland recently. The following were the successful candidates: Ernest E. Wooden, Edgar T. Wagner, Robert C. Marrow.